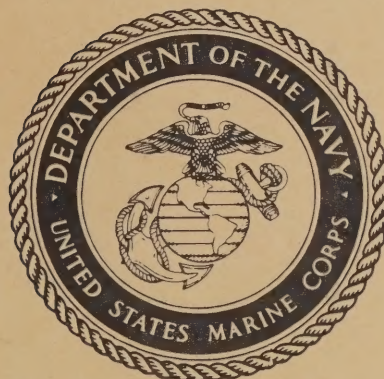


U.S. MARINE CORPS TECHNICAL MANUAL

COMMUNICATIONS TEST KIT, MK-1102/TYA-11, COMMUNICATIONS TEST KIT, MK-1104/TYA-11 AND TEST SET COUPLER, MX-8154/TYA-11

MAINTENANCE INSTRUCTIONS



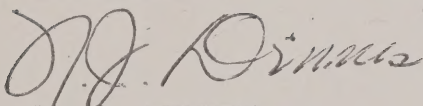
DEPARTMENT OF THE NAVY
Headquarters, U.S. Marine Corps
Washington, D. C. 20380

18 October 1968

1. This Manual is effective upon receipt and provides information pertaining to the description, installation, troubleshooting, and maintenance for the Communications Central Group, AN/TYA-11.
2. Notice of discrepancies and suggested changes to this Manual should be forwarded to the Commandant of the Marine Corps (Code CSY).

BY DIRECTION OF THE COMMANDANT OF THE MARINE CORPS

OFFICIAL



N. J. DENNIS
Colonel, U.S. Marine Corps
Director, Technical Division
Supply Department

DISTRIBUTION: 7000-161 (5)
2030/2076/2112/2116/2134/6025/6900/6905/
7480-01/7800-06 (2)
7000-24, -46/8145-04 (1)

DEPARTMENT OF THE NAVY
NAVY OFFICE, U. S. MARINE CORPS
WASHINGTON, D. C. 20380

10 October 1951

The following is a list of the names of the personnel who were assigned to the various units of the Marine Corps during the period from 1 October 1951 to 31 October 1951.

The names of the personnel who were assigned to the various units of the Marine Corps during the period from 1 October 1951 to 31 October 1951 are listed below.

BY DIRECTOR OF THE COMMANANT OF THE MARINE CORPS

10-10-41
JULY 1
NAVY OFFICE, U. S. MARINE CORPS
WASHINGTON, D. C. 20380

10-10-41
JULY 1
NAVY OFFICE, U. S. MARINE CORPS
WASHINGTON, D. C. 20380

LIST OF EFFECTIVE PAGES

PAGE NUMBERS	CHANGE IN EFFECT	PAGE NUMBERS	CHANGE IN EFFECT
Title	Original		
i thru xv	Original		
1-0 thru 1-37	Original		
2-0 thru 2-10	Original		
3-1 thru 3-128	Original		
4-1 thru 4-74	Original		
5-1 thru 5-80	Original		
i-1 thru i-8	Original		

CONTRACT:
M00027-67-C-0109

ORIGINAL

LIST OF EXHIBITS

EXHIBIT NO.	EXHIBIT TITLE	DATE	FILED IN
1
2
3
4
5
6
7
8
9
10

100-100000

RECORD OF CHANGES

REPORT OF THE			
COMMISSIONER OF THE			
LAND OFFICE			
STATE OF NEW YORK			
COUNTY OF			
TOWN OF			
SECTION OF			
VALUATION OF			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			
IMPROVEMENTS			
ON			
THE			
LANDS			
AND			

TABLE OF CONTENTS

Paragraph	Page	Paragraph	Page
SECTION 1 - GENERAL INFORMATION		SECTION 1 - GENERAL INFORMATION (Cont)	
1-1. Scope	1-1	(b) Special Purpose Electrical Cable Assembly W4, CX-10917/ TYA-11.....	1-6
1-2. General Description	1-1	(c) Radio Frequency Cable Assembly W5, W6, CG- 690D/U	1-6
a. Communications Test Kit, MK-1102/TYA-11	1-1	(d) Electrical Power Cable Assembly W1, CX-10932/ TYA-11.....	1-6
(1) Test Adapter, Fix- tures, and Radio Control	1-1	(e) Radio Frequency Cable Assembly W7, CG-3489/ TYA-11.....	1-6
(a) Test Adapter, MX-8150/ TYA-11	1-1	(f) Electrical Power Cable Assembly W2, CX-10933/ TYA-11.....	1-6
(b) Test Adapter, MX-8151/ TYA-11	1-4	(g) Special Purpose Electrical Cable Assembly W8, CX-11733/ TYA-11.....	1-7
(c) Test Adapter, MX-8152/ TYA-11	1-4	(4) Adapters and Con- nectors.....	1-7
(d) Test Set Coupler, MX-8153/ TYA-11	1-4	b. Communications Test Kit, MK-1104/TYA-11	1-7
(e) Radio Set Control, C-3811/AR	1-5	(1) Plug-in Unit Extenders.	1-7
(f) Module Extender, PL-1233/TYA-11.	1-5	(a) Module Extender, PL-1228/TYA-11.	1-7
(2) Test Accessories	1-5	(b) Test Adapter, MX-8158/ TYA-11.....	1-7
(a) Fixed Attenuators, CN-1248/U, CN-1249/U, and CN-1250/U	1-5	(c) Module Extender, PL-1227/TYA-11.	1-7
(b) Coaxial Crystal Mixer, CV-2513/U	1-5	(d) Module Extender, PL-1226/TYA-11.	1-7
(c) Electrical Dummy Load, DA-490/U .	1-5	(e) Module Extender, PL-1230/TYA-11.	1-8
(d) Radio Frequency Detector, RF-229/U	1-5	(f) Module Extender, PL-1229/TYA-11.	1-8
(e) Bandpass Filter, F-1233/U	1-5	(g) Electrical Con- nector Assembly, MX-8159/ TYA-11.....	1-8
(f) Adapter, Connector to Connector, UG-1842/TYA-11.	1-5		
(g) Fixed Mounting Rotating Counter, ECI03-01937- .001.....	1-5		
(3) Cable Assemblies.....	1-5		
(a) Special Purpose Electrical Cable Assembly W3, CX-10916/ TYA-11.....	1-6		

TABLE OF CONTENTS (Cont)

Paragraph	Page	Paragraph	Page
SECTION 1 - GENERAL INFORMATION (Cont)		SECTION 1 - GENERAL INFORMATION (Cont)	
(2) Cable Assemblies.....	1-8	(d) Connector Adapter, UG-1840/U.....	1-13
(a) Special Purpose Electrical Cable Assembly, CX-10920/ TYA-11.....	1-9	(e) Connector Adapter, UG-1841/U.....	1-13
(b) Special Purpose Electrical Cable Assembly, CX-10919/ TYA-11.....	1-9	c. Test Set Coupler, MX-8154/TYA-11	1-13
(c) Special Purpose Electrical Cable Assembly, CX-10918/ TYA-11.....	1-9	(1) Control Group Test Set Description.....	1-13
(d) Special Purpose Electrical Cable Assembly, CX-10928/ TYA-11.....	1-9	(2) Test Set Coupler, MX-8154/TYA-11, Cables.....	1-13
(e) Special Purpose Electrical Cable Assembly, CX-10929/ TYA-11.....	1-10	(a) Branched Special Purpose Elec- trical Cable As- sembly W1, ECI 12-01286-001	1-15
(f) Branched Special Purpose Elec- trical Cable As- sembly, CX-10930/ TYA-11.....	1-10	(b) Branched Special Purpose Elec- trical Cable As- sembly W2, ECI 12-01287-001	1-15
(g) Branched Special Purpose Elec- trical Cable As- sembly, CX-10931/ TYA-11.....	1-10	(c) Branched Special Purpose Elec- trical Cable As- sembly W3, ECI 12-01288-001	1-15
(3) Module Extenders.....	1-10	(d) Branched Special Purpose Elec- trical Cable As- sembly W4, ECI 12-01289-001	1-15
(a) Module Extender, PL-1233/TYA-11.	1-10	(e) Branched Special Purpose Elec- trical Cable As- sembly W5, ECI 12-01290-001	1-15
(b) Module Extender, PL-1232/TYA-11.	1-11	(f) Branched Special Purpose Elec- trical Cable As- sembly W6, ECI 12-01291-001	1-15
(c) Module Extender, PL-1231/TYA-11.	1-11	(g) Branched Special Purpose Elec- trical Cable As- sembly W7, ECI 12-01292-001	1-15
(4) Test Accessories.....	1-11	(h) Special Purpose Electrical Cable Assembly W8, ECI 12-01303-001	1-15
(a) Bandpass Filter, F-1233/U.....	1-11	1-3. Reference Data	1-15
(b) Lowpass Filter, F-1234/U.....	1-13	1-4. Equipment Supplied.....	1-15
(c) Coaxial Crystal Mixer, CV-2513/ U	1-13		

TABLE OF CONTENTS (Cont)

Paragraph	Page	Paragraph	Page
SECTION 1 - GENERAL INFORMATION (Cont)		SECTION 3 - OPERATION (Cont)	
1-5. Equipment and Publications Required but not Supplied	1-15	(4) Test Adapter, MX-8152/TYA-11 (part of Communications Test Kit, MK-1102/TYA-11) ...	3-3
1-6. Factory or Field Changes	1-16	(5) Test Set Coupler, MX-8153/TYA-11 (part of Communications Test Kit, MK-1102/TYA-11) ...	3-3
1-7. Equipment Similarities	1-16	(6) Test Adapter, MX-8158/TYA-11 (part of Communications Test Kit, MK-1104/TYA-11) ...	3-3
1-8. Preparation for Reshipment ...	1-16	(7) Radio Set Control, C-3811/AR (part of Communications Test Kit, MK-1102/TYA-11)	3-31
SECTION 2 - INSTALLATION		b. Indicator Presentations....	3-31
2-1. Unpacking and Handling	2-0	c. Tuning and Adjustment	3-31
2-2. Power Requirements	2-0	d. Test Set Coupler, MX-8154/TYA-11, Operating Procedures	3-32
2-3. Site Selection	2-0	(1) Radio Set Control Assembly, ECI 01-00507-001, Test Procedures	3-32
2-4. Installation Requirements	2-0	(a) Test Equipment ...	3-32
2-5. Cable Assemblies	2-0	(b) Test Setup	3-32
2-6. Inspection and Adjustment	2-0	(c) Operating Procedures	3-34
2-7. Interference Reduction	2-0	(2) Indicator-Test Electrical Assembly, ECI 01-00508-001, Test Procedures	3-34
SECTION 3 - OPERATION		(a) Test Equipment ...	3-34
3-1. Functional Operation	3-1	(b) Test Setup	3-34
a. Test Set Coupler, MX-8154/TYA-11	3-1	(c) Operating Procedures	3-34
b. Communications Test Kit, MK-1104/TYA-11	3-1	(3) DC Power Supply, ECI 01-00509-001, Test Procedure	3-35
c. Communications Test Kit, MK-1102/TYA-11	3-1	(a) Test Equipment ...	3-35
(1) Test Adapter, MX-8150/TYA-11....	3-2	(b) Test Setup	3-35
(2) Test Adapter, MX-8151/TYA-11....	3-2	(c) Operating Procedures	3-35
(3) Test Adapter, MX-8152/TYA-11....	3-2	(4) Five Channel Audio Amplifier-Converter, ECI 01-00730-001, Test Procedure	3-35
(4) Test Set Coupler, MX-8153/TYA-11....	3-2	(a) Test Equipment ...	3-35
(5) Radio Set Control, C-3811/AR.....	3-3		
(6) Fixed-Mounting Rotating Counter, ECI 03-01937-001.....	3-3		
3-2. Preparation for Use	3-3		
3-3. Operating Instructions	3-3		
a. Operating Controls and Indicators	3-3		
(1) Test Set Coupler, MX-8154/TYA-11....	3-3		
(2) Test Adapter, MX-8150/TYA-11 (part of Communications Test Kit, MK-1102/TYA-11) ...	3-3		
(3) Test Adapter, MX-8151/TYA-11 (part of Communications Test Kit, MK-1102/TYA-11) ...	3-3		

Paragraph	Page	Paragraph	Page
SECTION 3 - OPERATION (Cont)		SECTION 3 - OPERATION (Cont)	
(b) Test Setup	3-35	(6) Fixed - Mounting Rota- ting Counter, ECI 03-01937-001, Test Procedures	3-122
(c) Operating Pro- cedures	3-51	(a) Test Equipment . . .	3-122
(5) Communications Central Group Control, C-8019/TYA-11, Test Procedure	3-51	(b) Test Setup	
(a) Test Equipment . . .	3-51	(c) Operating Pro- cedures	3-126
(b) Test Setup	3-51	f. Communications Test Kit, MK-1104/TYA-11, Operating Proce- dures	3-126
(c) Operating Pro- cedures	3-51	3-4. Operator's Maintenance	3-126
e. Communications Test Kit, MK-1102/TYA-11, Oper- ating Procedures	3-51	a. Operating Checks and Adjustments	3-126
(1) Test Adapter, MX-8150/TYA-11, Test Procedures	3-59	b. Emergency Operating Procedure	3-126
(a) Test Equipment . . .	3-59	SECTION 4 - TROUBLESHOOTING	
(b) Test Setup	3-59	4-1. Logical Troubleshooting	4-1
(c) Operating Pro- cedures	3-61	a. Symptom Recognition	4-1
(2) Test Adapter, MX-8151/TYA-11, Test Procedures	3-61	b. Symptom Elaboration	4-1
(a) Test Equipment . . .	3-61	c. Listing Probable Faulty Function	4-1
(b) Test Setup	3-61	d. Localizing the Faulty Function	4-2
(c) Operating Pro- cedures	3-105	e. Localizing Trouble to the Circuit	4-2
(3) Test Adapter, MX-8152/TYA-11, Test Procedures	3-105	f. Failure Analysis	4-2
(a) Test Equipment . . .	3-105	4-2. Communications Test Kit, MK-1102/TYA-11	4-2
(b) Test Setup	3-105	a. Test Adapter, MX-8151/ TYA-11, Functional Description	4-2
(c) Operating Pro- cedures	3-106	(1) Description	4-3
(d) Tuned Cavity, FR-173/GRC, Test Setup	3-116	(a) Wide Band Audio Out Function	4-3
(e) Operating Pro- cedure	3-116	(b) Wide Band Audio In Function	4-3
(4) Test Set Coupler, MX-8153/TYA-11, Test Procedures	3-116	(c) Wide Band Key Function	4-3
(a) Test Equipment . . .	3-116	(d) +28 VDC Function . .	4-3
(b) Test Setup	3-116	(e) Narrow Band Audio Out Function	4-3
(c) Operating Pro- cedures	3-122	(f) Narrow Band Audio In Function	4-3
(5) Radio Set Control, C-3811/AR, Test Procedures	3-122	(g) Remote Test Key Function	4-3
(a) Preset Channel Frequency Se- lection	3-122	(h) Remote Keyline Function	4-3

TABLE OF CONTENTS (Cont)

Paragraph	Page	Paragraph	Page
SECTION 4 - TROUBLESHOOTING (Cont)		SECTION 4 - TROUBLESHOOTING (Cont)	
(i) Radio No. 5 Voice Indicator Function	4-3	(f) Hundreds Ground Function	4-5
(j) Remote Test Indicator Function ...	4-3	(g) +28 Vdc Servo Tune Gate Function....	4-5
(2) Test Data	4-3	(h) Hundredths Voltage Function	4-5
b. Test Adapter, MX-8150/TYA-11, Overall Functional Description	4-3	(i) High Track and Low Track Functions .	4-5
(1) Remote Operation Functional Section....	4-3	(j) 115 Vac Neutral and 115 Vac Phase B Functions	4-5
(a) Preset Channel Binary Code Function	4-3	(k) +28 Vdc and Ground Functions	4-5
(b) Narrow Band Audio In Function	4-3	(3) Transmit Antenna Coupler Functional Section	4-5
(c) Narrow Band Audio Out Function....	4-4	(a) Tens, Units, and Tenths Voltage Functions	4-5
(d) Keying Ground Function	4-4	(b) Adder Return and Tap 11 Functions .	4-5
(e) Remote Voice Indicator Function .	4-4	(c) Servo Command Ground Function .	4-6
(f) Fsk Data In Function	4-4	(d) Tap 13 Servo Command Voltage Function	4-6
(g) Fsk Keying Function	4-5	(e) Tap Function.....	4-6
(h) Fsk Data Out Function	4-5	(f) Hundreds Ground Function	4-6
(i) Remote Test Key Function	4-5	(g) +28 Vdc Servo Tune Gate Function....	4-6
(j) Remote Test Indicator Function...	4-5	(h) Hundredths Voltage Function	4-6
(k) Remote Equipment On Indicator Function	4-5	(i) High Track and Low Track Functions .	4-6
(l) Out Of Service Indicator Function .	4-5	(j) 115 Vac Power	4-6
(m) Data Indicator Function	4-5	(k) +28 Vdc and Ground Functions	4-6
(2) Receive Antenna Coupler Functional Section	4-5	(l) Servo Position Gate Function	4-6
(a) Tens, Units, and Tenths Voltage Functions	4-5	(m) Wide Band Audio In Function.....	4-6
(b) Adder Return and Tap 11 Functions .	4-5	(n) Wide Band Audio Out Function ...	4-6
(c) Servo Command Ground Function..	4-5	(o) Wide Band Select Function	4-6
(d) Tap 13 Servo Command Voltage Function	4-5	(4) Test Data	4-6
(e) Tap Function.....	4-5	c. Test Set Coupler, MX-8153/TYA-11, Overall Functional Description	4-6
		(1) Power Supply Functional Section.....	4-6
		(a) Description.....	4-6

TABLE OF CONTENTS (Cont)

Paragraph	Page	Paragraph	Page
SECTION 4 - TROUBLESHOOTING (Cont)		SECTION 4 - TROUBLESHOOTING (Cont)	
(b) Test Data	4-8	<u>8</u> Tenths Servo Command Function	4-11
<u>1</u> Test Equipment ..	4-8	<u>9</u> Adder Return, Tap 11, and Tap 12 Functions	4-11
<u>2</u> Test Setup	4-8	<u>10</u> Tens, Units, and Tenths Functions	4-11
<u>3</u> Trouble Isolation	4-8	<u>11</u> Hundredths Digit Function	4-11
<u>4</u> Adjustments and Alignments	4-8	<u>12</u> Even Units Ground	4-11
(c) +28 Volt Voltage Regulator Circuit Group	4-8	(b) Test Data	4-11
<u>1</u> Circuit (Stage) Description	4-8	d. Test Adapter, MX-8152/TYA-11, Overall Functional Description	4-11
<u>2</u> Test Data	4-8	(1) Power Supply Functional Section	4-11
<u>a</u> Test Equipment Required	4-8	(a) Description	4-11
<u>b</u> Test Setup	4-8	(b) Test Data	4-12
(2) Monitoring Functional Section	4-8	<u>1</u> Test Equipment ..	4-12
(a) Description	4-8	<u>2</u> Test Setup	4-12
<u>1</u> AGC Function	4-8	<u>3</u> Trouble Isolation	4-12
<u>2</u> High Track Function	4-8	<u>4</u> Adjustments and Alignments	4-13
<u>3</u> Low Track Function	4-9	(c) Circuit (Stage) Description	4-13
<u>4</u> Tap Function	4-9	<u>1</u> +28 Volt Voltage Regulator Circuit Group	4-13
<u>5</u> Low Level Audio Function	4-9	<u>2</u> Test Data	4-13
<u>6</u> Audio Function ..	4-9	(2) Remote Low Power Indicator Functional Section	4-13
<u>7</u> Data Function	4-9	(a) Description	4-13
<u>8</u> Antenna Function ..	4-9	(b) Test Data	4-13
<u>9</u> VFO Function	4-10	(3) Frequency Tuning Servo Functional Section	4-14
(b) Test Data	4-10	(a) Description	4-14
(3) Frequency Tuning Servo Functional Section	4-10	<u>1</u> Ac Power Distribution	4-14
(a) Description	4-10	<u>2</u> Dc Power Distribution	4-14
<u>1</u> Ac Power Distribution	4-11	<u>3</u> Hundreds Ground Function	4-14
<u>2</u> Dc Power Distribution	4-11	<u>4</u> Adder Return and Tap 11 Voltage Functions	4-14
<u>3</u> Servo Tune Signal ..	4-11		
<u>4</u> Hundreds Relay Ground	4-11		
<u>5</u> Voice-Data Relay Ground Function	4-11		
<u>6</u> Squelch Disable Function	4-11		
<u>7</u> Servo Tune Gate and Servo Command Gate Functions	4-11		

TABLE OF CONTENTS (Cont)

Paragraph	Page	Paragraph	Page
SECTION 4 - TROUBLESHOOTING (Cont)		SECTION 4 - TROUBLESHOOTING (Cont)	
(i) Radio No.5 Voice Indicator Function	4-3	(f) Hundreds Ground Function	4-5
(j) Remote Test Indicator Function...	4-3	(g) +28 Vdc Servo Tune Gate Function....	4-5
(2) Test Data	4-3	(h) Hundredths Voltage Function	4-5
b. Test Adapter, MX-8150/ TYA-11, Overall Functional Description	4-3	(i) High Track and Low Track Functions .	4-5
(1) Remote Operation Functional Section....	4-3	(j) 115 Vac Neutral and 115 Vac Phase B Functions	4-5
(a) Preset Channel Binary Code Function	4-3	(k) +28 Vdc and Ground Functions	4-5
(b) Narrow Band Audio In Function.....	4-3	(3) Transmit Antenna Coupler Functional Section	4-5
(c) Narrow Band Audio Out Function.....	4-4	(a) Tens, Units, and Tenths Voltage Functions	4-5
(d) Keying Ground Function	4-4	(b) Adder Return and Tap 11 Functions .	4-5
(e) Remote Voice Indicator Function .	4-4	(c) Servo Command Ground Function .	4-6
(f) Fsk Data In Function	4-4	(d) Tap 13 Servo Command Voltage Function	4-6
(g) Fsk Keying Function	4-5	(e) Tap Function.....	4-6
(h) Fsk Data Out Function	4-5	(f) Hundreds Ground Function	4-6
(i) Remote Test Key Function	4-5	(g) +28 Vdc Servo Tune Gate Function....	4-6
(j) Remote Test Indicator Function...	4-5	(h) Hundredths Voltage Function	4-6
(k) Remote Equipment On Indicator Function	4-5	(i) High Track and Low Track Functions .	4-6
(l) Out Of Service Indicator Function .	4-5	(j) 115 Vac Power	4-6
(m) Data Indicator Function	4-5	(k) +28 Vdc and Ground Functions	4-6
(2) Receive Antenna Coupler Functional Section	4-5	(l) Servo Position Gate Function	4-6
(a) Tens, Units, and Tenths Voltage Functions	4-5	(m) Wide Band Audio In Function.....	4-6
(b) Adder Return and Tap 11 Functions .	4-5	(n) Wide Band Audio Out Function ...	4-6
(c) Servo Command Ground Function..	4-5	(o) Wide Band Select Function	4-6
(d) Tap 13 Servo Command Voltage Function	4-5	(4) Test Data	4-6
(e) Tap Function.....	4-5	c. Test Set Coupler, MX-8153/ TYA-11, Overall Functional Description	4-6
		(1) Power Supply Functional Section.....	4-6
		(a) Description.....	4-6

TABLE OF CONTENTS (Cont)

Paragraph	Page	Paragraph	Page
SECTION 4 - TROUBLESHOOTING (Cont)		SECTION 4 - TROUBLESHOOTING (Cont)	
(b) Test Data	4-8	<u>8</u> Tenths Servo Command Function	4-11
<u>1</u> Test Equipment ..	4-8	<u>9</u> Adder Return, Tap 11, and Tap 12 Functions	4-11
<u>2</u> Test Setup	4-8	<u>10</u> Tens, Units, and Tenths Functions	4-11
<u>3</u> Trouble Isolation	4-8	<u>11</u> Hundredths Digit Function	4-11
<u>4</u> Adjustments and Alignments	4-8	<u>12</u> Even Units Ground	4-11
(c) +28 Volt Voltage Regulator Circuit Group	4-8	(b) Test Data	4-11
<u>1</u> Circuit (Stage) Description	4-8	d. Test Adapter, MX-8152/TYA-11, Overall Functional Description	4-11
<u>2</u> Test Data	4-8	(1) Power Supply Functional Section	4-11
<u>a</u> Test Equipment Required	4-8	(a) Description	4-11
<u>b</u> Test Setup	4-8	(b) Test Data	4-12
(2) Monitoring Functional Section	4-8	<u>1</u> Test Equipment ..	4-12
(a) Description	4-8	<u>2</u> Test Setup	4-12
<u>1</u> AGC Function	4-8	<u>3</u> Trouble Isolation	4-12
<u>2</u> High Track Function	4-8	<u>4</u> Adjustments and Alignments	4-13
<u>3</u> Low Track Function	4-9	(c) Circuit (Stage) Description	4-13
<u>4</u> Tap Function	4-9	<u>1</u> +28 Volt Voltage Regulator Circuit Group	4-13
<u>5</u> Low Level Audio Function	4-9	<u>2</u> Test Data	4-13
<u>6</u> Audio Function	4-9	(2) Remote Low Power Indicator Functional Section	4-13
<u>7</u> Data Function	4-9	(a) Description	4-13
<u>8</u> Antenna Function ..	4-9	(b) Test Data	4-13
<u>9</u> VFO Function	4-10	(3) Frequency Tuning Servo Functional Section	4-14
(b) Test Data	4-10	(a) Description	4-14
(3) Frequency Tuning Servo Functional Section	4-10	<u>1</u> Ac Power Distribution	4-14
(a) Description	4-10	<u>2</u> Dc Power Distribution	4-14
<u>1</u> Ac Power Distribution	4-11	<u>3</u> Hundreds Ground Function	4-14
<u>2</u> Dc Power Distribution	4-11	<u>4</u> Adder Return and Tap 11 Voltage Functions	4-14
<u>3</u> Servo Tune Signal ..	4-11		
<u>4</u> Hundreds Relay Ground	4-11		
<u>5</u> Voice-Data Relay Ground Function	4-11		
<u>6</u> Squelch Disable Function	4-11		
<u>7</u> Servo Tune Gate and Servo Command Gate Functions	4-11		

TABLE OF CONTENTS (Cont)

Paragraph	Page	Paragraph	Page
SECTION 4 - TROUBLESHOOTING (Cont)		SECTION 4 - TROUBLESHOOTING (Cont)	
5 Low Track Function	4-14	(3) Receiver Audio Functional Section	4-19
6 Tap Function ...	4-14	(a) Description	4-20
7 Tens, Units, and Tenths Functions	4-14	(b) Test Data	4-20
8 Hundredths Voltage Function ..	4-14	(4) Remote Audio Functional Section	4-20
9 Ground Function.	4-14	(a) Description	4-20
10 High Track Function	4-14	(b) Test Data	4-20
11 Servo Malfunction	4-14	(5) External Audio Functional Section	4-20
12 Servo Command Ground Function	4-14	(a) Description	4-20
13 Servo Position Gate Function	4-14	(b) Test Data	4-23
(b) Test Data	4-14	(6) Loading Functional Section	4-23
e. Radio Set Control, C-3811/AR Overall Functional Description	4-15	(a) Description	4-23
(1) Description	4-15	(b) Test Data	4-23
(a) Manual Frequency Selection	4-15	d. Radio Set Control Functional Section	4-23
(b) Preset Channel Selection	4-15	(1) Description	4-23
(2) Test Data	4-15	(a) Dc Power Distribution	4-23
4-3. Test Set Coupler, MX-8154/TYA-11, Overall Functional Description	4-15	(b) Remote Power On Return	4-23
a. Test Set Coupler Power Supply Functional Section ..	4-16	(c) Receiver Audio Function	4-23
(1) Description	4-16	(d) External Phone Audio and Keying Ground Function ..	4-23
(2) Test Data	4-17	(e) Handset Audio Listen Function	4-24
(a) Test Equipment	4-17	(f) Handset Audio Talk Function	4-24
(b) Test Setup	4-17	(g) Mike Bias and Transmitter Keying Functions	4-24
(c) Adjustments and Alignments	4-17	(h) Remote Preset Channel Code Function	4-24
(3) +12 Volt Regulator Circuit Group	4-17	(i) Local Preset Channel Code Function ..	4-24
(a) Description	4-17	(j) Remote In Use Indicator Function ..	4-24
(b) Test Data	4-17	(k) Out of Service Indicator Function ..	4-24
b. Control-Power Supply Functional Section	4-17	(2) Test Data	4-24
(1) Description	4-19	(3) Circuit (Stage) Description	4-25
(2) Test Data	4-19	(a) Light Drivers	4-25
c. Audio Amplifier Functional Section, Overall Functional Description	4-19	(b) Timing Pulse Generator	4-25
(1) Description	4-19	(c) Transformers and Light Drivers	4-25
(2) Test Data	4-19	(d) Test Data	4-25

TABLE OF CONTENTS (Cont)

Paragraph	Page	Paragraph	Page
SECTION 4 - TROUBLESHOOTING (Cont)		SECTION 4 - TROUBLESHOOTING (Cont)	
e. Indicator Test Functional		(2) Remote Keylines	4-29
Section	4-25	(3) External Audio	4-29
(1) Description	4-25	(4) External Keylines	4-29
(a) Dc Power Dis-		(5) Subassembly Ground ...	4-29
tribution	4-26	(6) Ac Power	4-29
(b) Status Indicator		(7) Transmitter Audio	4-29
Function	4-26	(8) Receiver Audio	4-29
(c) Rf Power Test		(9) Dc Power	4-29
Function	4-26	b. Test Data	4-29
(d) Data Mode		4-5. Servicing Block Diagrams	4-29
Function	4-26		
(e) External Phone			
Audio Function ..	4-26		
(f) RSCA Mode			
Function	4-26		
(g) Test Mode			
Function	4-26		
(2) Test Data	4-27		
(3) Circuit (Stage) De-			
scription	4-27		
(a) Sync Circuitry	4-27		
(b) Voltage Divider ...	4-27		
(c) Test Data	4-27		
f. Central Group Control			
Functional Section	4-27		
(1) Description	4-27		
(a) Power Distribution.	4-27		
(b) Preset Channel			
Code Function ...	4-28		
(c) Intercom Functions.	4-28		
(d) Transmit Radio			
Functions	4-28		
(e) Microphone Circuit			
Functions	4-28		
(f) Remote In Use In-			
dicator Function..	4-28		
(g) Microphone Bias			
Function	4-28		
(h) Keying Function ...	4-28		
(2) Test Data	4-28		
(3) Circuit (Stage) De-			
scription	4-28		
(a) Light Drivers	4-28		
(b) Control Relays	4-28		
(c) Transformers and			
Light Drivers	4-28		
(d) Test Data	4-29		
4-4. Communications Test Kit,			
MK-1104/TYA-11	4-29		
a. Test Adapter, MX-8158/			
TYA-11, Functional			
Description	4-29		
(1) Remote Audio	4-29		

SECTION 4 - TROUBLESHOOTING (Cont)

(2) Remote Keylines	4-29
(3) External Audio	4-29
(4) External Keylines	4-29
(5) Subassembly Ground ...	4-29
(6) Ac Power	4-29
(7) Transmitter Audio	4-29
(8) Receiver Audio	4-29
(9) Dc Power	4-29
b. Test Data	4-29
4-5. Servicing Block Diagrams	4-29

SECTION 5 - MAINTENANCE

5-1. Failure, and Performance and	
Operational Reports	5-1
5-2. Repair Instructions	5-1
a. Communications Test Kit,	
MK-1102/TYA-11,	
Repair Instructions	5-1
(1) Removal	5-1
(2) Repair	5-1
(3) Replacement	5-1
(4) Lubrication	5-1
b. Communications Test Kit,	
MK-1104/TYA-11,	
Repair Instructions	5-1
(1) Removal	5-1
(2) Repair	5-1
(3) Replacement	5-1
(4) Lubrication	5-1
c. Test Set Coupler, MX-8154/	
TYA-11, Repair	
Instructions	5-1
(1) Removal	5-1
(2) Repair	5-1
(3) Replacement	5-1
(4) Lubrication	5-1
5-3. Adjustment Procedures	5-1
a. Test Adapter, MX-8152/	
TYA-11, Adjustment	5-2
b. Test Set Coupler,	
MX-8153/TYA-11,	
Adjustment	5-2
(1) +28-Volt Regulator A1	
Printed Wiring Board,	
ECI 61-00929-001,	
Adjustment	5-2
(2) Servotune Signal Adjust-	
ment	5-2
c. Test Set Coupler,	
MX-8154/TYA-11,	
Adjustment	5-3

TABLE OF CONTENTS (Cont)

Paragraph	Page	Paragraph	Page
SECTION 5 - MAINTENANCE (Cont)		SECTION 5 - MAINTENANCE (Cont)	
(1) +12-Volt Regulator Printed Wiring Board A1, ECI61-00967-001, Adjustment.....	5-3	5-4. Illustrations	5-4
(2) Transformers and Light Drivers Printed Wir- ing Board A5, ECI 61-00945-001, Ad- justment	5-3	a. Part Location Illustrations	5-4
		b. Wire Running Lists	5-4
		c. Ac Primary Power Sche- matic Diagrams	5-4
		d. Equipment Schematic Diagrams.....	5-4

LIST OF ILLUSTRATIONS

Figure	Page	Figure	Page
SECTION 1 - GENERAL INFORMATION		SECTION 2 - INSTALLATION	
1-1. Communications Central Group, AN/TYA-11, Maintenance Equipment	1-0	2-1. Communications Test Kit, MK-1102/TYA-11, Installation Drawing.....	2-3
1-2. Communications Test Kit, MK-1102/TYA-11, Test Adapters, Fixtures, and Radio Control	1-2	2-2. Communications Test Kit, MK-1104/TYA-11, Installation Drawing.....	2-5
1-3. Communications Test Kit, MK-1102/TYA-11, Test Accessories.....	1-6	2-3. Test Set Coupler, MX-8154/ TYA-11, Installation Drawing	2-9
1-4. Communications Test Kit, MK-1102/TYA-11, Cable Assemblies	1-7	SECTION 3 - OPERATION	
1-5. Communications Test Kit, MK-1102/TYA-11, Adapters and Connectors	1-8	3-1. Test Set Coupler, MX-8154/ TYA-11, Front Panel Oper- ating Controls, Indicators, Connectors, and Test Points..	3-4
1-6. Communications Test Kit, MK-1104/TYA-11, Plug-In Unit Extenders	1-10	3-2. Test Adapter, MX-8150/ TYA-11, Test Points and Connectors	3-10
1-7. Communications Test Kit, MK-1104/TYA-11, Cable Assemblies	1-12	3-3. Test Adapter, MX-8151/ TYA-11, Test Points and Connectors	3-16
1-8. Communications Test Kit, MK-1104/TYA-11, Module Extenders.....	1-12	3-4. Test Adapter, MX-8152/ TYA-11, Operating Con- trols, Indicators, Con- nectors, and Test Points	3-17
1-9. Communications Test Kit, MK-1104/TYA-11, Test Accessories.....	1-13	3-5. Test Set Coupler, MX-8153/ TYA-11, Operating Controls, Indicators, Connectors, and Test Points	3-21
1-10. Control Group Test Set, ECI 01-00784-001.....	1-14	3-6. Test Adapter, MX-8158/ TYA-11, Test Points and Connectors	3-26
1-11. Test Set Coupler, MX-8154/TYA-11, Cable Assemblies.....	1-14		

LIST OF ILLUSTRATIONS (Cont)

Figure		Page	Figure		Page
SECTION 3 - OPERATION (Cont)			SECTION 4 - TROUBLESHOOTING (Cont)		
3-7.	Radio Set Control, C-3811/AR, Operating Controls.....	3-32	4-3.	+28 Volt Regulator Circuit Group, Simplified Sche- matic Diagram	4-10
3-8.	Radio Set, AN/GRC-112, Mini- mum Performance Standards Check, Preliminary Test Setup No.1	3-60	4-4.	Test Adapter, MX-8152/ TYA-11, Overall Block Diagram	4-12
3-9.	Radio Set, AN/GRC-112, Mini- mum Performance Standards Check, Test Setup No.2	3-66	4-5.	Test Set Coupler, MX-8154/ TYA-11, Overall Block Diagram	4-16
3-10.	Radio Set, AN/GRC-112, Mini- mum Performance Standards Check, Test Setup No.3	3-71	4-6.	+12 Volt Regulator Circuit Group, Simplified Sche- matic Diagram	4-19
3-11.	Radio Set, AN/GRC-112, Mini- mum Performance Standards Check, Test Setup No.4	3-74	4-7.	Audio Amplifier Functional Section, Overall Block Diagram	4-21
3-12.	Radio Set, AN/GRC-112, Mini- mum Performance Standards Check, Test Setup No.5	3-77	4-8.	Timing Pulse Generator Output Waveform.....	4-25
3-13.	Radio Set, AN/GRC-112, Mini- mum Performance Standards Check, Test Setup No.6	3-79	4-9.	Test Adapter, MX-8151/ TYA-11, Servicing Block Diagram	4-30
3-14.	Radio Set, AN/GRC-112, Mini- mum Performance Standards Check, Test Setup No.7	3-85	4-10.	Remote Operation Functional Section, Servicing Block Diagram	4-31
3-15.	Radio Set, AN/GRC-112, Mini- mum Performance Standards Check, Test Setup No.8	3-89	4-11.	Receive Antenna Coupler Func- tional Section, Servicing Block Diagram	4-32
3-16.	Radio Set, AN/GRC-112, Mini- mum Performance Standards Check, Test Setup No.9	3-93	4-12.	Transmit Antenna Coupler Functional Section, Ser- vicing Block Diagram	4-33
3-17.	Radio Set, AN/GRC-112, Mini- mum Performance Standards Check, Test Setup No.10	3-95	4-13.	Test Set Coupler, MX-8153/ TYA-11, Power Supply Func- tional Section, Servicing Block Diagram	4-35
3-18.	Radio Set, AN/GRC-134, Mini- mum Performance Standards Check, Preliminary Test Setup	3-106	4-14.	Monitoring Functional Section, Servicing Block Diagram	4-37
3-19.	Antenna Coupler, CU-1406/ GRC, Minimum Performance Standards Check, Prelimi- nary Test Setup.....	3-111	4-15.	Frequency Tuning Servo Func- tional Section, Servicing Block Diagram	4-39
3-20.	Tuned Cavity, FR-173/GRC, Minimum Performance Standards Check, Pre- liminary Test Setup	3-117	4-16.	Test Adapter Power Supply Functional Section, Ser- vicing Block Diagram	4-43
SECTION 4 - TROUBLESHOOTING			4-17.	Remote Low Power Indicator Functional Section, Ser- vicing Block Diagram	4-45
4-1.	Test Adapter, MX-8150/ TYA-11, Overall Block Diagram	4-4	4-18.	Frequency Tuning Servo Func- tional Section, Servicing Block Diagram	4-47
4-2.	Test Set Coupler, MX-8153/ TYA-11, Overall Block Diagram	4-7	4-19.	Control Group Test Set Power Supply Functional Section, Servicing Block Diagram	4-49
			4-20.	Control-Power Supply Func- tional Section, Servicing Block Diagram	4-51

LIST OF ILLUSTRATIONS (Cont)

Figure	Page	Figure	Page
SECTION 4 - TROUBLESHOOTING (Cont)		SECTION 5 - MAINTENANCE (Cont)	
4-21. Receiver Audio Functional Section, Servicing Block Diagram	4-53	5-13. Light Drivers Printed Wiring Board A2, ECI 61-00943-001, Part Location	5-57
4-22. Remote Audio Functional Section, Servicing Block Diagram	4-55	5-14. Pulse Generator and Sync Circuitry Printed Wiring Board A3, ECI 61-00942-001, Part Location	5-58
4-23. External Audio Functional Section, Servicing Block Diagram	4-57	5-15. Transformer and Control Relay Printed Wiring Board A4, ECI 61-00944-001, Part Location	5-58
4-24. Loading Functional Section, Servicing Block Diagram	4-59	5-16. Transformers and Light Driver Printed Wiring Board A5, ECI 61-00945-001, Part Location	5-59
4-25. Radio Set Control Functional Section, Servicing Block Diagram	4-61	5-17. Test Adapter, MX-8152/TYA-11, Ac Primary Power Distribution, Schematic Diagram	5-59
4-26. Indicator Test Functional Section, Servicing Block Diagram	4-65	5-18. Test Set Coupler, MX-8153/TYA-11, Ac Primary Power Distribution, Schematic Diagram	5-60
4-27. Control Group Control Functional Section, Servicing Block Diagram	4-69	5-19. Test Set Coupler, MX-8154/TYA-11, Ac Primary Power Distribution, Schematic Diagram	5-60
4-28. Test Set Coupler, MX-8153/TYA-11, Servicing Block Diagram	4-71	5-20. Test Adapter, MX-8152/TYA-11, Schematic Diagram ..	5-61
SECTION 5 - MAINTENANCE		5-21. Test Set Coupler, MX-8153/TYA-11, Schematic Diagram ..	5-63
5-1. Test Adapter, MX-8150/TYA-11, Part Location	5-42	5-22. Radio Set Control, C-3811/AR, Schematic Diagram	5-65
5-2. Test Adapter, MX-8151/TYA-11, Part Location	5-44	5-23. Test Set Coupler, MX-8154/TYA-11, Schematic Diagram ..	5-67
5-3. Test Adapter, MX-8152/TYA-11, Part Location	5-45	5-24. +12-Volt Regulator Printed Wiring Board A1, ECI 61-00967-001, Schematic Diagram	5-71
5-4. +28-Volt Regulator, Printed Wiring Board A1, ECI 61-00929-001, Part Location	5-47	5-25. Light Drivers Printed Wiring Board A2, ECI 61-00943-001, Schematic Diagram	5-73
5-5. Heat Sink, ECI 67-02324-001, Part Location	5-47	5-26. Pulse Generator and Sync Circuitry Printed Wiring Board A3, ECI 61-00942-001, Schematic Diagram	5-75
5-6. Test Set Coupler, MX-8153/TYA-11, Part Location	5-48	5-27. Transformer and Control Relay Printed Wiring Board A4, ECI 61-00944-001, Schematic Diagram	5-77
5-7. 18/28-Volt Power Supply, Printed Wiring Board A2, ECI 61-00928-001, Part Location	5-50	5-28. Transformer and Light Drivers Printed Wiring Board A5, ECI 61-00945-001, Schematic Diagram	5-79
5-8. Heat Sink, ECI 67-02325-001, Part Location	5-50		
5-9. Radio Set Control, C-3811/AR, Part Location	5-51		
5-10. Test Adapter, MX-8158/TYA-11, Part Location	5-52		
5-11. Test Set Coupler, MX-8154/TYA-11, Part Location	5-54		
5-12. +12-Volt Regulator Printed Wiring Board A1, ECI 61-00967-001, Part Location	5-56		

LIST OF TABLES

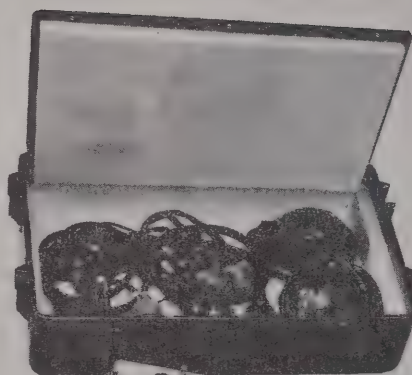
Table	Page	Table	Page
SECTION 1 - GENERAL INFORMATION		SECTION 3 - OPERATION (Cont)	
1-1. Adapters and Connectors.....	1-9	3-10. Operating Instructions for Test Set Coupler, MX-8154/ TYA-11, When Testing Power Supply, ECI 01-00509-001 ...	3-50
1-2. Communications Test Kit, MK-1102/TYA-11, Reference Data	1-16	3-11. Operating Instructions for Test Set Coupler, MX-8154/ TYA-11, When Testing Audio Amplifier-Converter, ECI 01-00730-001.....	3-52
1-3. Communications Test Kit, MK-1104/TYA-11, Reference Data	1-22	3-12. Operating Instructions for Test Set Coupler, MX-8154/ TYA-11, When Testing Com- munications Central Control Group, C-8019/TYA-11	3-54
1-4. Test Set Coupler, MX-8154/ TYA-11, Reference Data	1-27	3-13. Test Adapter, MX-8150/ TYA-11, Operating Instructions	3-62
1-5. Equipment Supplied.....	1-31	3-14. Test Adapter, MX-8151/ TYA-11, Operating Instructions	3-107
1-6. Equipment and Publications Required But Not Supplied ...	1-36	3-15. Operating Instructions for Test Adapter, MX-8152/ TYA-11, When Testing Antenna Coupler, CU- 1406/GRC.....	3-112
SECTION 2 - INSTALLATION		3-16. Operating Instructions for Test Adapter, MX-8152/TYA-11, When Testing Tuned Cavity, FR-173/GRC	3-118
2-1. Power Requirements	2-1	3-17. Operating Instructions for Test Set Coupler, MX-8153/ TYA-11, When Testing Syn- thesizer-Receiver, ECI 03- 00510-001, ECI 03-00510-002, or ECI 03-00510-003.....	3-123
2-2. Cable Assemblies	2-1	3-18. Preset Channel Frequencies...	3-125
SECTION 3 - OPERATION		3-19. Operating Instructions for Fixed Mounting Rotating Counter, ECI03-01937-001, When Test- ing Amplifier Assembly, AM-4343/GRC	3-127
3-1. Test Set Coupler, MX-8154/ TYA-11, Operating Controls, Indicators, Connectors, and Test Points	3-5	SECTION 4 - TROUBLESHOOTING	
3-2. Test Adapter, MX-8150/ TYA-11, Test Points and Connectors	3-11	4-1. Test Set Coupler, MX-8153/ TYA-11, Power Supply, Trouble Isolation	4-9
3-3. Test Adapter, MX-8151/ TYA-11, Test Points and Connectors	3-16	4-2. Test Adapter, MX-8152/ TYA-11, Power Supply, Trouble Isolation	4-13
3-4. Test Adapter, MX-8152/ TYA-11, Operating Con- trols, Indicators, Connectors, and Test Points.....	3-18	4-3. Test Set Coupler, MX-8154/ TYA-11, Power Supply, Trouble Isolation	4-18
3-5. Test Set Coupler, MX-8153/ TYA-11, Operating Controls, Indicators, Connectors, and Test Points	3-22		
3-6. Test Adapter, MX-8158/ TYA-11, Test Points and Connectors	3-27		
3-7. Radio Set Control, C-3811/AR, Operating Controls.....	3-33		
3-8. Operating Instructions for Test Set Coupler, MX-8154/ TYA-11, When Testing Radio Set Control Assembly, ECI 01-00507-001.....	3-36		
3-9. Operating Instructions for Test Set Coupler, MX-8154/ TYA-11, When Testing Indi- cator Test Electrical, ECI 01-00508-001.....	3-44		

LIST OF TABLES (Cont)

Table		Page	Table		Page
SECTION 5 - MAINTENANCE			SECTION 5 - MAINTENANCE (Cont)		
5-1.	Assembly-to-Part Location Cross-Reference List	5-4	5-16.	Branched Special Purpose Elec- trical Cable Assembly, CX-10930/TYA-11, Wire Running List	5-20
5-2.	Wire Running Lists	5-5	5-17.	Branched Special Purpose Elec- trical Cable Assembly, CX-10931/TYA-11, Wire Running List	5-24
5-3.	Schematic Diagrams	5-6	5-18.	Branched Special Purpose Elec- trical Cable Assembly W1, ECI 12-01286-001, Wire Running List	5-28
5-4.	Test Adapter, MX-8150/ TYA-11, Wire Running List..	5-6	5-19.	Branched Special Purpose Elec- trical Cable Assembly W2, ECI 12-01287-001, Wire Running List	5-31
5-5.	Test Adapter, MX-8151/ TYA-11, Wire Running List..	5-8	5-20.	Branched Special Purpose Elec- trical Cable Assembly W3, ECI 12-01288-001, Wire Running List	5-33
5-6.	Special Purpose Electrical Cable Assembly W3, CX-10916/TYA-11, Wire Running List	5-9	5-21.	Branched Special Purpose Elec- trical Cable Assembly W4, ECI 12-01289-001, Wire Running List	5-36
5-7.	Special Purpose Electrical Cable Assembly W4, CX-10917/TYA-11, Wire Running List	5-11	5-22.	Branched Special Purpose Elec- trical Cable Assembly W5, ECI 12-01290-001, Wire Running List	5-37
5-8.	Electrical Power Cable Assem- bly W1, CX-10932/TYA-11, Wire Running List	5-12	5-23.	Branched Special Purpose Elec- trical Cable Assembly W6, ECI 12-01291-001, Wire Running List	5-37
5-9.	Electrical Power Cable Assem- bly W2, CX-10933/TYA-11, Wire Running List	5-12	5-24.	Branched Special Purpose Elec- trical Cable Assembly W7, ECI 12-01292-001, Wire Running List	5-39
5-10.	Test Adapter, MX-8158/ TYA-11, Wire Running List..	5-13	5-25.	Special Purpose Electrical Cable Assembly W8, ECI 12-01303-001, Wire Running List	5-41
5-11.	Special Purpose Electrical Cable Assembly, CX-10920/ TYA-11, Wire Running List..	5-16			
5-12.	Special Purpose Electrical Cable Assembly, CX-10919/ TYA-11, Wire Running List..	5-17			
5-13.	Special Purpose Electrical Cable Assembly, CX-10918/ TYA-11, Wire Running List..	5-18			
5-14.	Special Purpose Electrical Cable Assembly, CX-10928/ TYA-11, Wire Running List..	5-19			
5-15.	Special Purpose Electrical Cable Assembly, CX-10929/ TYA-11, Wire Running List..	5-19			



COMMUNICATIONS
TEST KIT,
MK-1102/TYA-11



TEST SET, COUPLER,
MX-8154/TYA-11



COMMUNICATIONS
TEST KIT
MK-1104/TYA-11

54563-5-98

Figure 1-1. Communications Central Group, AN/TYA-11, Maintenance Equipment

SECTION 1

GENERAL INFORMATION

1-1. SCOPE. Information pertaining to the description, installation, operation, troubleshooting and maintenance of the Communications Central Group, AN/TYA-11, maintenance equipment is contained in this manual, TM-M00027-67-C-0109, Electronic Equipment Manual (Type II) for Communications Test Kit, MK-1102/TYA-11; Communications Test Kit, MK-1104/TYA-11; and Test Set Coupler, MX-8154/TYA-11. The format of this publication has been prepared in accordance with Military Specification MIL-M-15071E (SHIPS), dated 15 April 1962, and Contract M00027-67-C-0109. This manual is in effect upon receipt. Extracts from this publication may be made to facilitate the preparation of other Department of Defense publications. This manual consists of five sections and pertains to the test equipment contained in Communications Test Kits, MK-1102/TYA-11 and MK-1104/TYA-11, and Test Set Coupler, MX-8154/TYA-11, used to maintain Communications Central Group, AN/TYA-11. This manual is intended for use by trained personnel having previous experience in installing, operating, troubleshooting, and maintaining similar or related equipment. Section 1, General Information, consists of description, reference data, equipment supplied, equipment and publications required but not supplied, and general information pertaining to the equipment covered in this manual. Section 2, Installation, contains information necessary to unpack and prepare the Communications Test Kits, MK-1102/TYA-11 and MK-1104/TYA-11, and the Test Set Coupler, MX-8154/TYA-11, equipment for operation. Section 3, Operation, contains test setups, operating procedures, and Communication Control Group, AN/TYA-11, equipment testing procedures. If an abnormal indication is obtained while testing Communications Central Group, AN/TYA-11, equipment, the procedure references the appropriate manual for troubleshooting information. Section 4, Troubleshooting, contains functional and detailed theory, trouble isolation, and test data required to maintain the Communications Central

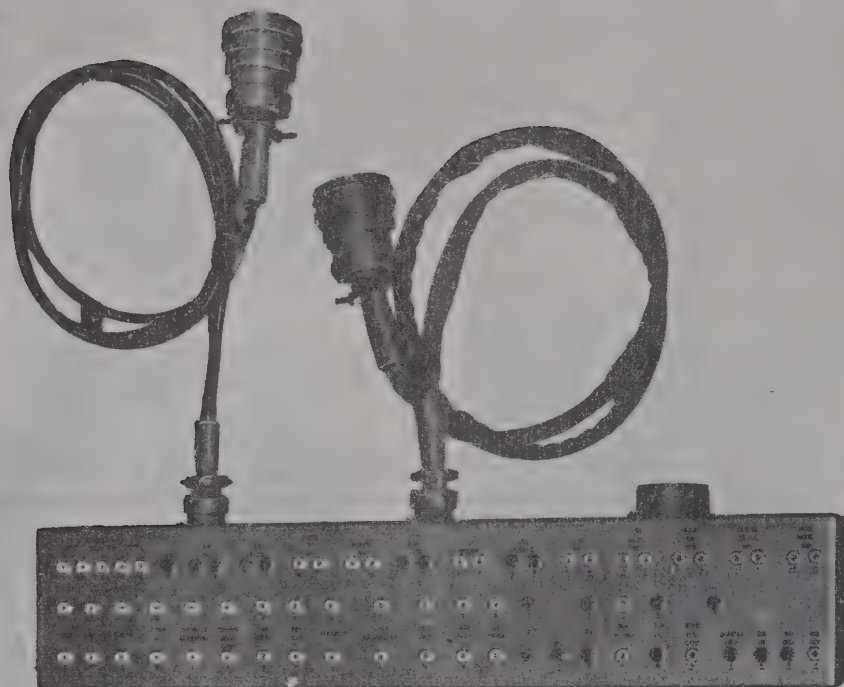
Group, AN/TYA-11, maintenance equipment. Section 5, Maintenance, contains the repair and replacement procedures, part location illustrations, wire running lists, and schematic diagrams for Communications Central Group, AN/TYA-11, maintenance equipment.

1-2. GENERAL DESCRIPTION. Communications Central Group, AN/TYA-11, maintenance equipment consists of Communications Test Kits, MK-1102/TYA-11 and MK-1104/TYA-11, and Test Set Coupler, MX-8154/TYA-11, as shown in Figure 1-1. The following paragraphs describe the test equipment contained in MK-1102/TYA-11, MK-1104/TYA-11, and MX-8154/TYA-11.

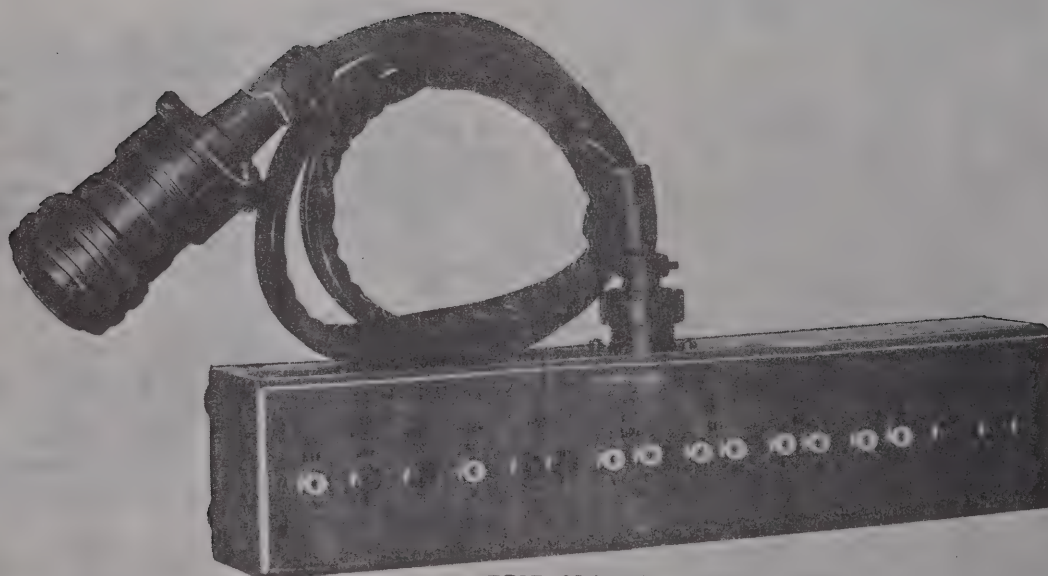
a. COMMUNICATIONS TEST KIT, MK-1102/TYA-11. Communications Test Kit, MK-1102/TYA-11, contains the test equipment described in the following paragraphs and consists of test adapters, fixtures, and radio control; cable assemblies; and adapters and connectors. Communications Test Kit, MK-1102/TYA-11, is contained in Transit Case, ECI 67-02422-001.

(1) Test Adapters, Fixtures, and Radio Control. Communications Test Kit, MK-1102/TYA-11, contains six test adapters and fixtures, and one radio control assembly, described in the following paragraphs and shown in Figure 1-2.

(a) Test Adapter, MX-8150/TYA-11. Test Adapter, MX-8150/TYA-11, provides a method of connecting test equipment to monitor Radio Set, AN/GRC-112, prime functions, signals, and voltages. Test Adapter, MX-8150/TYA-11,



TEST ADAPTER, MX-8150/TYA-II



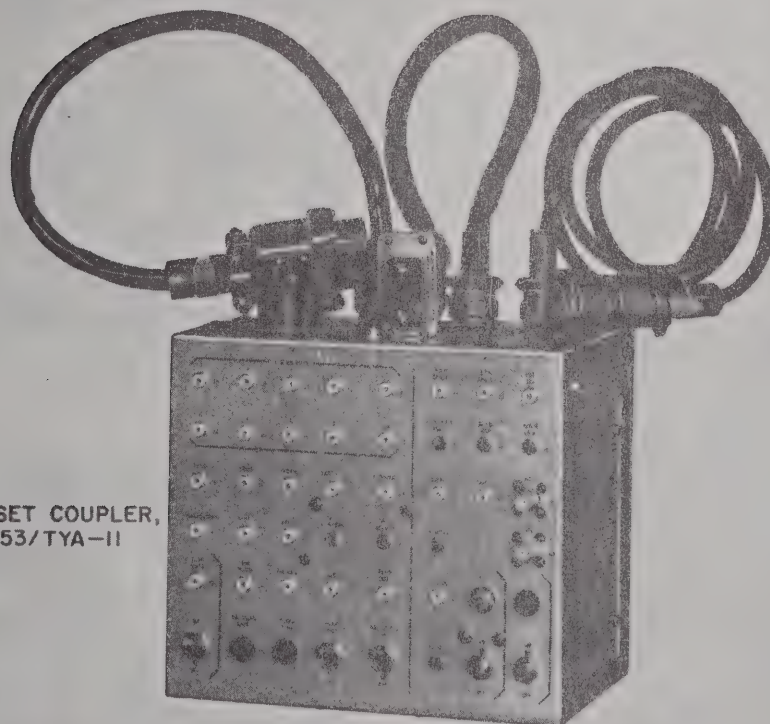
TEST ADAPTER, MX-8151/TYA-II

34563-9-38 (SHEET 1)

Figure 1-2. Communications Test Kit, MK-1102/TYA-11, Test Adapters,
Fixtures, and Radio Control (Sheet 1 of 3)



TEST ADAPTER,
MX-8152/TYA-II



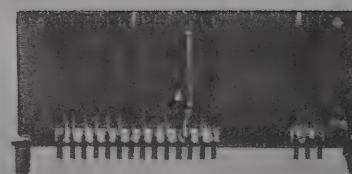
TEST SET COUPLER,
MX-8153/TYA-II

54563-5-38 (SHEET 2)

Figure 1-2. Communications Test Kit, MK-1102/TYA-11, Test Adapters,
Fixtures, and Radio Control (Sheet 2 of 3)



RADIO SET CONTROL, C-3811/AR



MODULE EXTENDER,
PL-1233/TYA-11

54563-5-38 (SHEET 3)

Figure 1-2. Communications Test Kit, MK-1102/TYA-11, Test Adapters, Fixtures, and Radio Control (Sheet 3 of 3)

connects to A7A1J2, A7A1J3, and A7A1J4 on Radio Set, AN/GRC-112. Two of the interconnecting cables are part of Test Adapter, MX-8150/TYA-11, and the third cable (CX-10917/TYA-11) is supplied as part of the kit.

(b) Test Adapter, MX-8151/TYA-11. Test Adapter, MX-8151/TYA-11, provides a method of connecting test equipment to monitor Radio Set, AN/GRC-134, prime functions, signals, and voltages. Test Adapter, MX-8151/TYA-11, connects to A4A1J1 on Radio Set, AN/GRC-134, and provides 17 monitoring jacks.

(c) Test Adapter, MX-8152/TYA-11. Test Adapter, MX-8152/TYA-11, is used to test and maintain Antenna Coupler, CU-1406/GRC, and Tuned Cavity, FR-173/GRC. Test Adapter, MX-8152/TYA-11, provides a method of connecting test equipment to monitor Antenna Coupler, CU-1406/GRC prime functions, signals, and voltages. Also, Test Adapter, MX-8152/TYA-11, contains a power supply and

power control switches which furnishes Antenna Coupler, CU-1406/GRC, or Tuned Cavity, FR-173/GRC, with +28 vdc. Power input to Test Adapter, MX-8152/TYA-11, is routed through connector P3 and Radio Set Control, C-3811/AR, signals are routed through connector J1. Antenna Coupler, CU-1406/GRC, power is routed from Test Adapter, MX-8152/TYA-11, at connector P2 and channeling signals are routed from connector P1.

(d) Test Set Coupler, MX-8153/TYA-11. Test Set Coupler, MX-8153/TYA-11, is used to maintain Synthesizer-Receiver, ECI 01-00510-001, and ECI 01-00510-003, used in Radio Set, AN/GRC-112, and Synthesizer-Receiver, ECI 01-00510-002, used in Radio Set, AN/GRC-134. Test Set Coupler, MX-8153/TYA-11, provides a method of connecting test equipment to monitor synthesizer-receivers prime functions, signals, and voltages. In addition, Test Set Coupler, MX-8153/TYA-11, contains a dc power supply which furnishes the synthesizer-receivers with +28 vdc and -18 vdc. Switches are provided to control

the application of ac and dc power, receiver muting, tenths servo command, and squelch disable. Servotuning and command gate indicator lamps are also provided. Test Set Coupler, MX-8153/TYA-11, is applied through connector P1 and Radio Set Control, C-3811/AR, is connected by cable to J3.

(e) Radio Set Control, C-3811/AR. Radio Set Control, C-3811/AR, is used to supply servoing information to Test Set Coupler, MX-8153/TYA-11, and Test Adapter, MX-8152/TYA-11, when using the two test fixtures to test and maintain Synthesizer-Receiver, O-1282 (V)/GRC, (ECI 01-00510-001, 01-00510-002, and 01-00510-003) or Antenna Coupler, CU-1406/GRC, respectively. Radio Set Control, C-3811/AR, allows selection of 1 of 20 preset channels (frequencies) or selection of any frequency between 225.00 and 399.95 mcs in 5-mcs steps. Connection of signal voltages and power to and from Radio Set Control, C-3811/AR, is made through connector J1401.

(f) Module Extender, PL-1233/TYA-11. Module Extender, PL-1233/TYA-11, extends all printed-circuit boards in Radio Set Control Assembly, ECI 01-00507-001; Indicator Test Electrical Assembly, ECI 01-00508-001; Communications Central Group Control, C-8019/TYA-11; and Five Channel Audio Amplifier-Converter, ECI 01-00730-001, (Audio Amplifier-Converter). Radio Set Control Assembly, ECI 01-00507-001, and Indicator Test Electrical Assembly, ECI 01-00508-001, are part of the Control Power Supply Group, ECI 01-00513-001. Module Extender, PL-1233/TYA-11, is wired pin for pin and allows access to test points on the printed-circuit board under test.

(2) Test Accessories. Communications Test Kit, MK-1102/TYA-11 contains the nine test accessories described in the following paragraphs and shown in Figure 1-3.

(a) Fixed Attenuators, CN-1248/U, CN-1249/U, and CN-1250/U. Four Fixed Attenuators, CN-1248/U, CN-1249/U (two), and CN-1250/U, are used in test setups where signal attenuation of 6 db, 10 db, or 26 db, respectively, is required. The attenuators are linear, passive, and bidirectional. One of

the two connectors on the attenuators mates with a female type-N connector and the other connector mates with a male type-N connector.

(b) Coaxial Crystal Mixer, CV-2513/U. Coaxial Crystal Mixer, CV-2513/U, is a broad-band rf mixer. The output circuit contains a lowpass filter with a cutoff frequency of 40 mcs. A 250-ohm series resistor isolates the circuit from the local oscillator input.

(c) Electrical Dummy Load, DA-490/U. Electrical Dummy Load, DA-490/U, is used in test setups where a load of up to 2 watts is required. The dummy load is effective for frequency from dc to 10 mcs and the input connector mates with a type-N female connector.

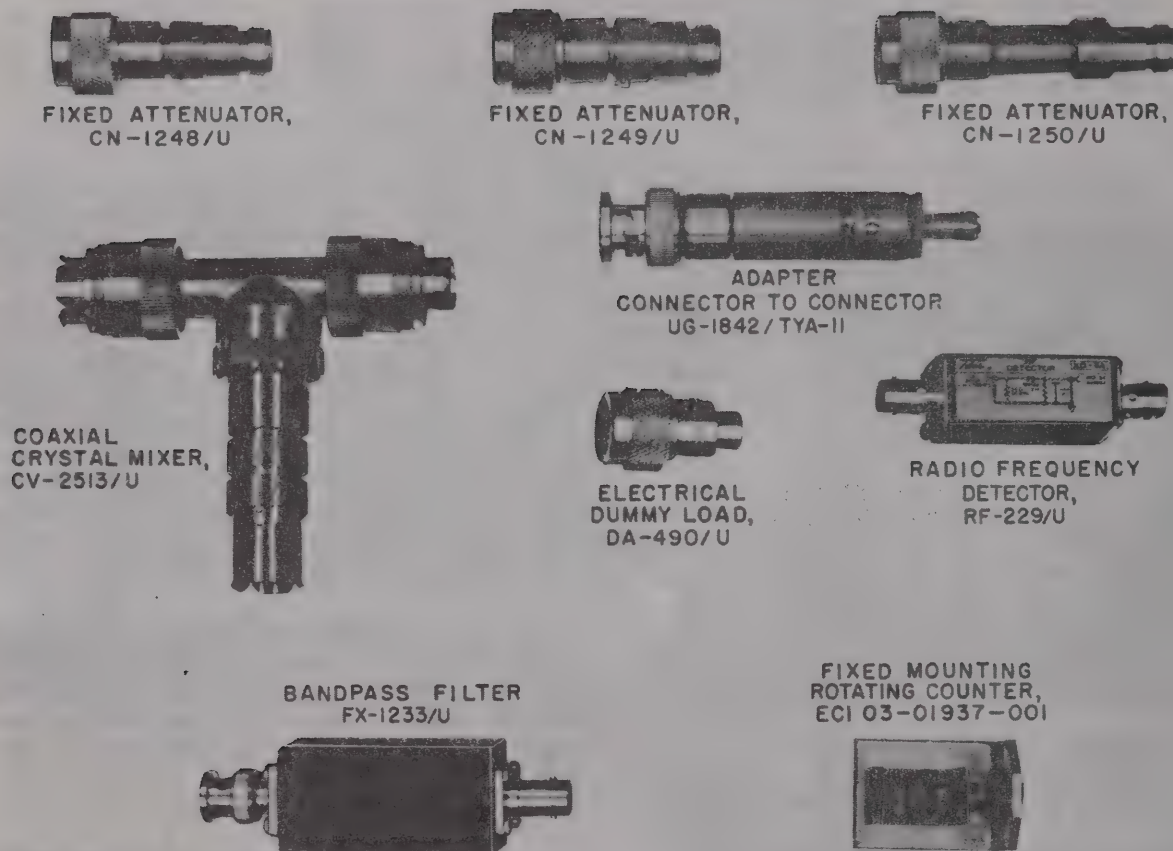
(d) Radio Frequency Detector, RF-229/U. Radio Frequency Detector, RF-229/U, is a half-wave detector capable of detecting frequencies from 0.1 to 1000 mcs. The input and output connectors are BNC-type connectors.

(e) Bandpass Filter, F-1233/U. Bandpass Filter, F-1233/U, is a 1.2 mcs bandpass filter. The filter passes all frequencies between 50 kc/s and 1.2 mcs and effectively attenuates all other frequencies.

(f) Adapter, Connector to Connector, UG-1842/TYA-11. Adapter, Connector to Connector, UG-1842/TYA-11, mates a special cavity connector to a BNC-type connector.

(g) Fixed Mounting Rotating Counter, ECI 03-01937-001. Fixed Mounting Rotating Counter, ECI 03-01937-001, is used to align the tuned cavities in Radio Set, AN/GRC-112, and Radio Set, AN/GRC-134. The counter indicates the mechanical position of the tuning elements in the cavities.

(3) Cable Assemblies. Communications Test Kit, MK-1102/TYA-11, contains eight cable assemblies. These cables are described in the following paragraphs and shown in Figure 1-4.



54563-5-39

Figure 1-3. Communications Test Kit, MK-1102/TYA-11, Test Accessories

(a) Special Purpose Electrical Cable Assembly W3, CX-10916/TYA-11. Special Purpose Electrical Cable Assembly W3, CX-10916/TYA-11, connects between Radio Set Control, C-3811/AR, connector J1401, and Test Set Coupler, MX-8153/TYA-11, connector J3, or Test Adapter, MX-8152/TYA-11, connector J1. The cable carries all power and signals between Radio Set Control, C-3811/AR, and Test Adapter, MX-8152/TYA-11.

(b) Special Purpose Electrical Cable Assembly W4, CX-10917/TYA-11. Special Purpose Electrical Cable Assembly W4, CX-10917/TYA-11, connects between Radio Set, AN/GRC-112, connector A7A1J4 and Test Adapter, MX-8150/TYA-11, connector P4. The cable routes wide band audio functions, frequency selection, and servotune signals to test jacks on Test Adapter, MX-8150/TYA-11.

(c) Radio Frequency Cable Assembly W5, W6, CG-690D/U. Two Radio Frequency Cable

Assemblies W5 and W6, CG-690/U, are furnished in Communications Test Kit, MK-1102/TYA-11. The cables are coaxial rf power cables with a type-HN connector on one end and a type-H connector on the other end.

(d) Electrical Power Cable Assembly W1, CX-10932/TYA-11. Electrical Power Cable Assembly W1, CX-10932/TYA-11, routes power between a facility power connector and power connector A7A1J1 on Radio Set, AN/GRC-112.

(e) Radio Frequency Cable Assembly W7, CG-3489/TYA-11. Radio Frequency Cable Assembly W7, CG-3489/TYA-11, is a coaxial rf power cable with a type-L connector on one end and a type-N connector on the other end.

(f) Electrical Power Cable Assembly W2, CX-10933/TYA-11. Electrical Power Cable Assembly W2, CX-10933/TYA-11, routes power between a facility power connector and power connector A4A1J2 on Radio Set AN/GRC-134.

(g) Special Purpose Electrical Cable Assembly W8, CX-11733/TYA-11. Special Purpose Electrical Cable Assembly W8, CX-11733/TYA-11, provides the interconnection between Test Adapter, MX-8152/TYA-11, and Tuned Cavity, FR-173/GRC.

(4) Adapters and Connectors. Communications Test Kit, MK-1102/TYA-11, contains 15 adapters and connectors used in making the various required test setups. Table 1-1 lists the adapters and connectors by nomenclature, part number, or type of connectors. The connectors and adapters are shown in Figure 1-5.

b. COMMUNICATIONS TEST KIT, MK-1104/TYA-11. Communications Test Kit, MK-1104/TYA-11, contains test equipment which consists of plug-in unit extenders, cable assemblies, printed-wiring board extenders, and test accessories. The following paragraphs describe the test equipment. All the test equipment which comprises Communications Test Kit, MK-1104/TYA-11, is contained in Test Kit Case, CY-6520/TYA-11.

(1) Plug-In Unit Extenders. Communications Test Kit, MK-1104/TYA-11, contains seven card-type extenders which are used to extend plug-in units located in Communication Central Group, AN/TYA-11. The extenders are described in the following paragraphs and shown in Figure 1-6.

(a) Module Extender, PL-1228/TYA-11. Module Extender, PL-1228/TYA-11, extends Radio Frequency Oscillator, ECI 03-01088-001, plug-in unit from either Radio Set, AN/GRC-112, or Radio Set, AN/GRC-134. The extender is wired pin for pin and allows access to test points on Radio Frequency Oscillator, ECI 03-01088-001.

(b) Test Adapter, MX-8158/TYA-11. Test Adapter, MX-8158/TYA-11, allows monitoring input and output signals to Five Channel Audio Amplifier-Converter, ECI 01-00730-001. The adapter, when connected routes input and output signals to the test jacks on the adapter for ease of monitoring without interrupting the normal circuits.

(c) Module Extender, PL-1227/TYA-11. Module Extender, PL-1227/TYA-11, extends Radio Frequency AM. Detector, ECI 03-01092-002, from either Radio Set, AN/GRC-112, or Radio Set, AN/GRC-134. The adapter is wired pin for pin and allows access to test points on Radio Frequency AM. Detector, ECI 03-01092-002.

(d) Module Extender, PL-1226/TYA-11. Module Extender, PL-1226/TYA-11, extends Intermediate Frequency Amplifier, ECI 03-01090-001, from either Radio Set, AN/GRC-112, or

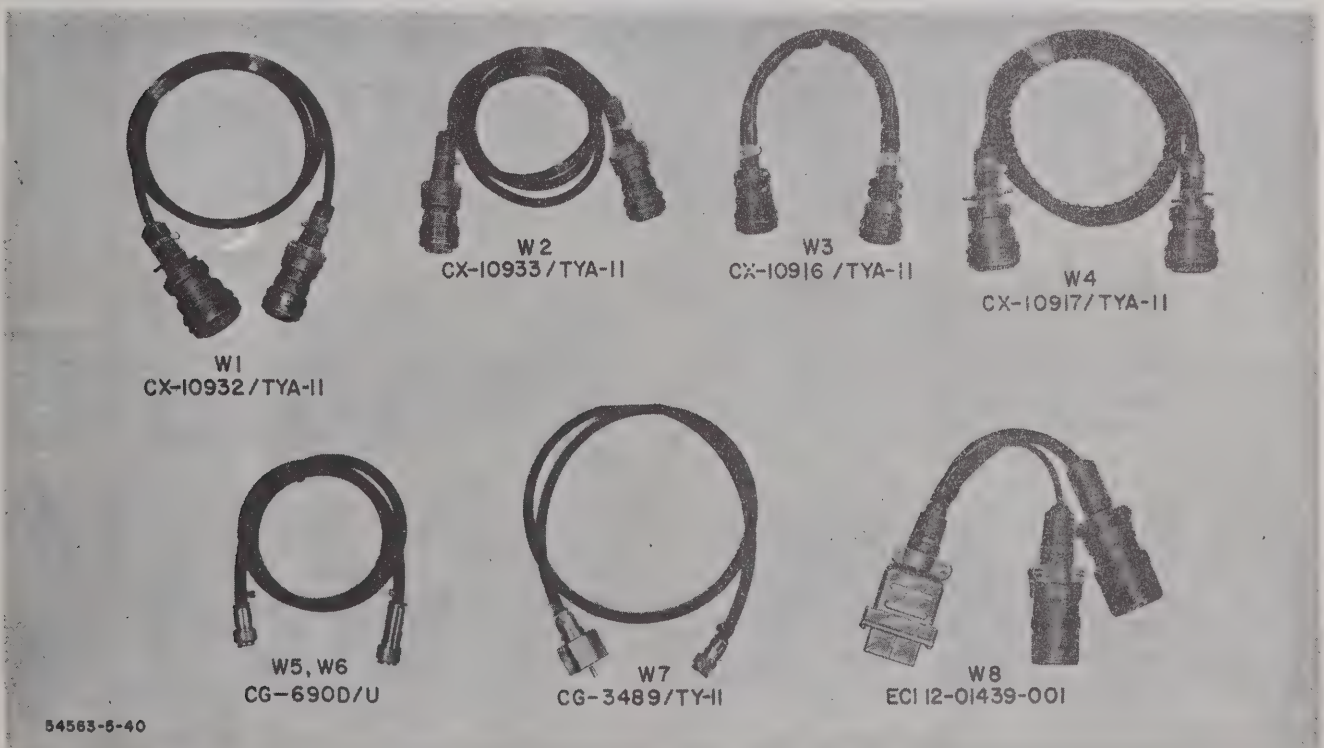


Figure 1-4. Communications Test Kit, MK-1102/TYA-11, Cable Assemblies

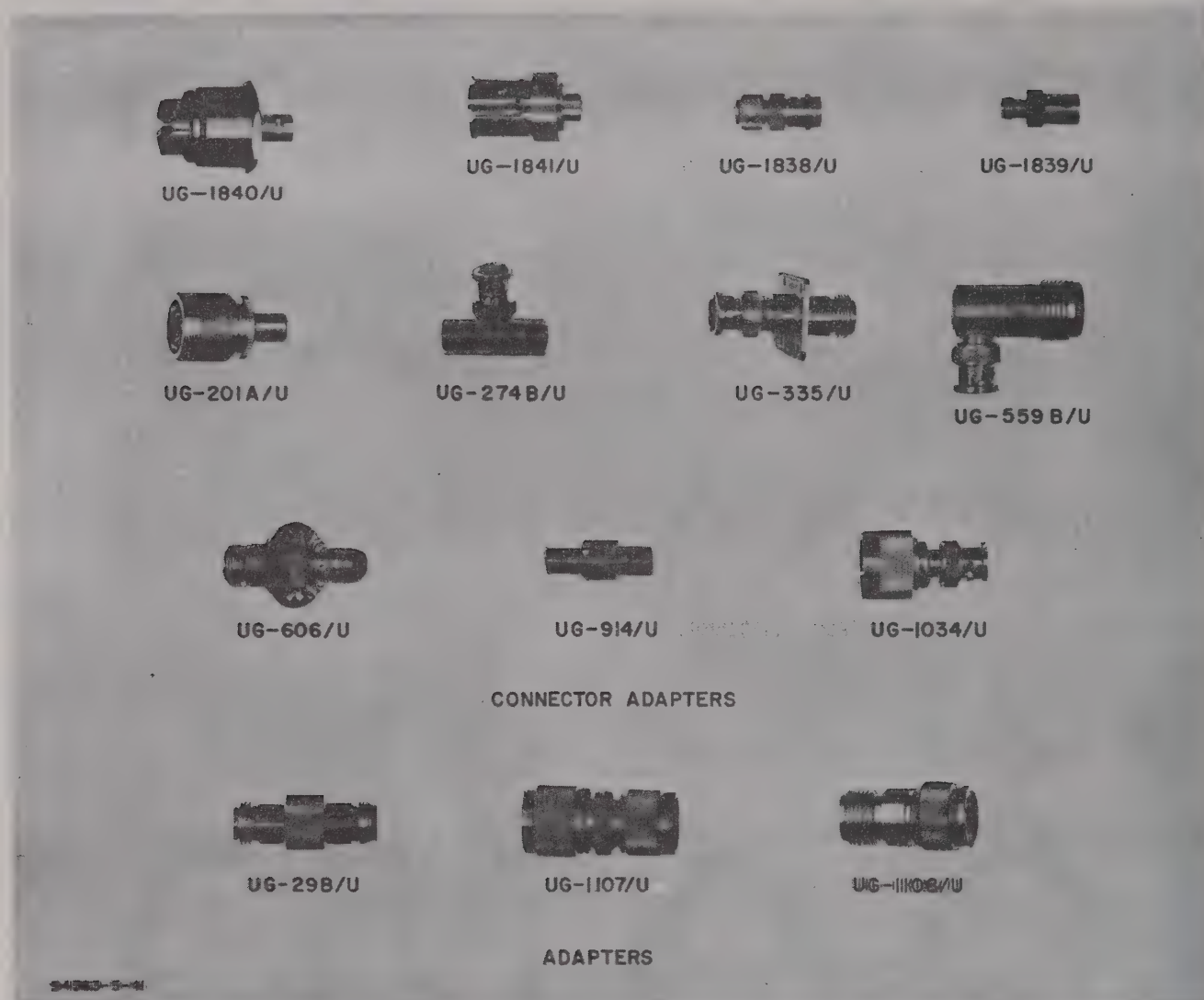


Figure 1-5. Communications Test Kit, MK-1102/TYA-11, Adapters and Connectors

Radio Set, AN/GRC-134. The adapter is wired pin for pin and allows access to test points on Intermediate Frequency Amplifier, ECI 03-01090-001.

(e) Module Extender, PL-1230/TYA-11. Module Extender, PL-1230/TYA-11, extends Intermediate Frequency Amplifier, ECI 03-01091-001, from either Radio Set, AN/GRC-112, or Radio Set, AN/GRC-134. The adapter is wired pin for pin and allows access to test points on Intermediate Frequency Amplifier, ECI 03-01091-001.

(f) Module Extender, PL-1229/TYA-11. Module Extender, PL-1229/TYA-11, extends Radio Frequency FM Detector, ECI 03-01093-001,

from Radio Set, AN/GRC-112. The adapter is wired pin for pin and allows access to test points on Radio Frequency FM Detector, ECI 03-01093-001.

(g) Electrical Connector Assembly, MX-8159/TYA-11. Electrical Connector Assembly, MX-8159/TYA-11, extends Voltage Regulator Set, ECI 03-01094-001, from either Radio Set, AN/GRC-112, or Radio Set, AN/GRC-134. The connector assembly is wired pin for pin and allows access to test points on the Voltage Regulator Set, ECI 03-01094-001.

(2) Cable Assemblies. Communications Test Kit, MK-1104/TYA-11, contains seven cable assemblies described in the following paragraphs

TABLE 1-1. ADAPTERS AND CONNECTORS

NOMENCLATURE	PART NO.	CONNECTOR TYPES
Connector Adapter (2)	UG-1840/U	GR874 BNC male, BNC female
Connector Adapter	UG-1841/U	GR874 BNC male, BNC female
Connector Adapter	UG-1838/U	Miniature TNC male, BNC female
Connector Adapter	UG-1839/U	Miniature TNC female, BNC female
Adapter	UG-29B/U	N female, N female
Connector Adapter	UG-201A/U	BNC male, N female
Connector Adapter	UG-274B/U	BNC male, BNC male, BNC female
Connector Adapter	UG-335/U	N female, BNC male
Connector Adapter	UG-559B/U	HN male, BNC female
Connector Adapter	UG-606/U	N female, BNC female
Connector Adapter	UG-914/U	BNC female, BNC female
Connector Adapter	UG-1034/U	BNC male, N male
Adapter	UG-1107/U	N male, HN male
Adapter	UG-1108/U	N male, HN female
Adapter, Connector to Connector	UG-1842/TYA-11	BNC to special connector (see Figure 1-3)

and shown in Figure 1-7 to extend assemblies or plug-in units within Communications Central Group, AN/TYA-11.

(a) Special Purpose Electrical Cable Assembly, CX-10920/TYA-11. Special Purpose Electrical Cable Assembly, CX-10920/TYA-11, extends the Electronic Control Amplifier, ECI 03-01592-001, from either Radio Set, AN/GRC-112, or Radio Set, AN/GRC-134. Use of the cable assembly allows access to test points on the Electronic Control Amplifier, ECI 03-01592-001.

(b) Special Purpose Electrical Cable Assembly, CX-10919/TYA-11. Special Purpose Electrical Cable Assembly, CX-10919/TYA-11, extends either Radio Frequency FSK Modulator, ECI 03-01106-001, from Radio Set, AN/GRC-112, or Radio Frequency Oscillator, ECI 03-01166-001, from Radio Set, AN/GRC-134. Use of the cable assembly allows access to test points on either Radio Frequency FSK Modulator,

ECI 03-01106-001, or on Radio Frequency Oscillator, ECI 03-01166-001.

(c) Special Purpose Electrical Cable Assembly, CX-10918/TYA-11. Special Purpose Electrical Cable Assembly, CX-10918/TYA-11, extends Radio Frequency AM. Modulator, ECI 03-01069-003, from either Radio Set, AN/GRC-112, or Radio Set, AN/GRC-134. Use of the cable assembly allows access to test points on Radio Frequency AM. Modulator, ECI 03-01069-003.

(d) Special Purpose Electrical Cable Assembly, CX-10928/TYA-11. Special Purpose Electrical Cable Assembly, CX-10928/TYA-11, extends Power Supply Subassembly, ECI 03-01390-001, from DC Power Supply, ECI 01-00509-001. DC Power Supply, ECI 01-00509-001, is part of Control Power Supply Group, ECI 03-00513-001. Use of the cable assembly allows access to test points on Power Supply Subassembly, ECI 03-01390-001.

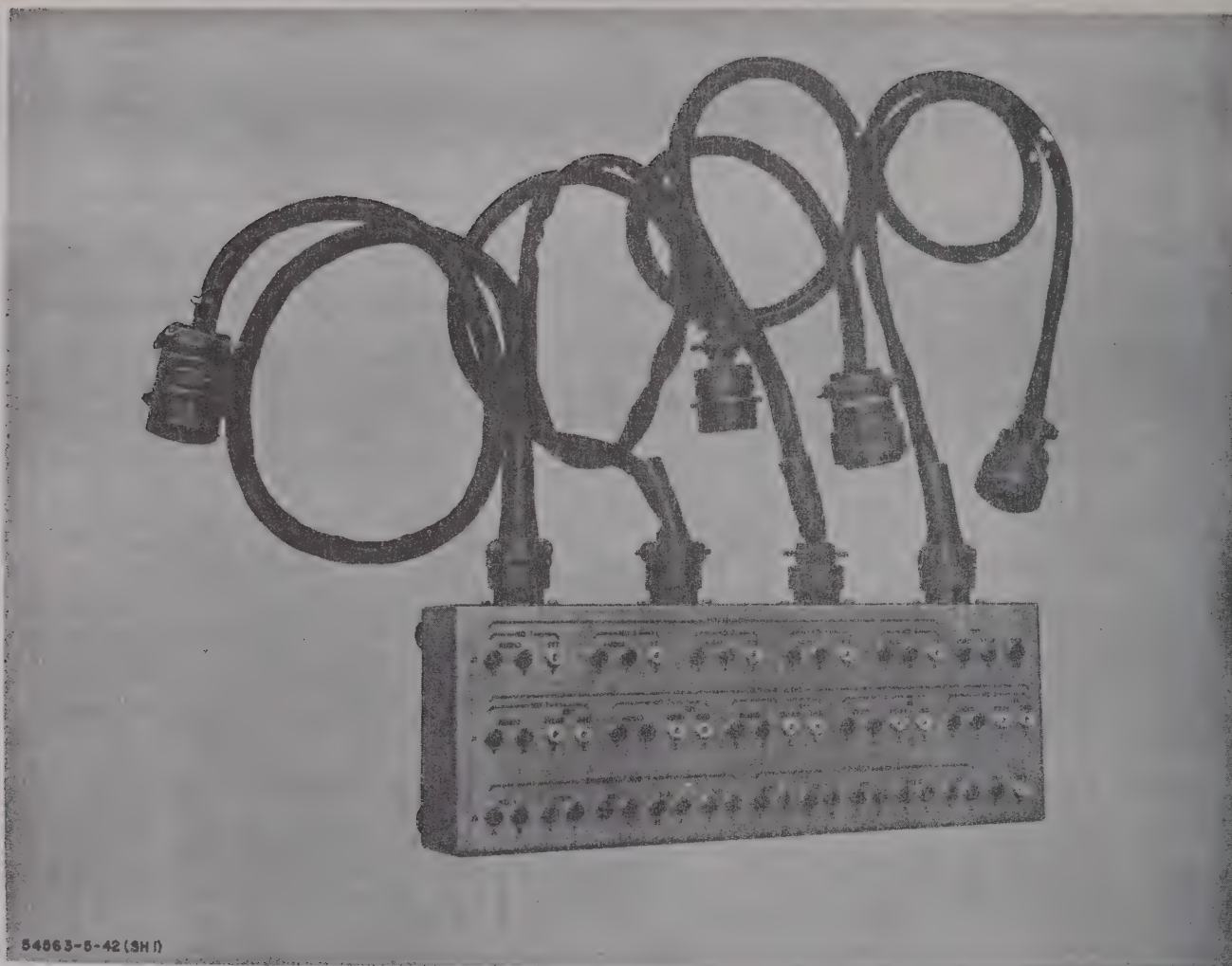


Figure 1-6. Communications Test Kit, MK-1104/TYA-11, Plug-In Unit Extenders (Sheet 1 of 2)

(e) Special Purpose Electrical Cable Assembly, CX-10929/TYA-11. Special Purpose Electrical Cable Assembly, CX-10929/TYA-11, extends DC Power Supply, ECI 01-00509-001, from Control Power Supply Group, ECI 01-00513-001. Use of the cable assembly allows access to test points on DC Power Supply, ECI 01-00509-001.

(f) Branched Special Purpose Electrical Cable Assembly, CX-10930/TYA-11. Branched Special Purpose Electrical Cable Assembly, CX-10930/TYA-11, extends Radio Set Control Assembly, ECI 01-00507-001, from Control Power Supply Group, ECI 01-00513-001. Use of the cable assembly allows access to test points on Radio Set Control Assembly, ECI 01-00507-001.

(g) Branched Special Purpose Electrical Cable Assembly, CX-10931/TYA-11. Branched

Special Purpose Electrical Cable Assembly, CX-10931/TYA-11, extends Indicator Test Electrical Assembly, ECI 01-00508-001, from Control Power Supply Group, ECI 01-00513-001. Use of the cable assembly allows access to test points on Indicator Test Electrical Assembly, ECI 01-00508-001.

(3) Module Extenders. Communications Test Kit, MK-1104/TYA-11, contains three module extenders used to extend printed-wiring boards in Communications Central Group, AN/TYA-11, equipment. The extenders are described in the following paragraphs and shown in Figure 1-8.

(a) Module Extender, PL-1233/TYA-11. Module Extender, PL-1233/TYA-11, is also supplied in Communications Test Kit, MK-1102/TYA-11. Refer to paragraph 1-2a(1)(f) for the module extender description.

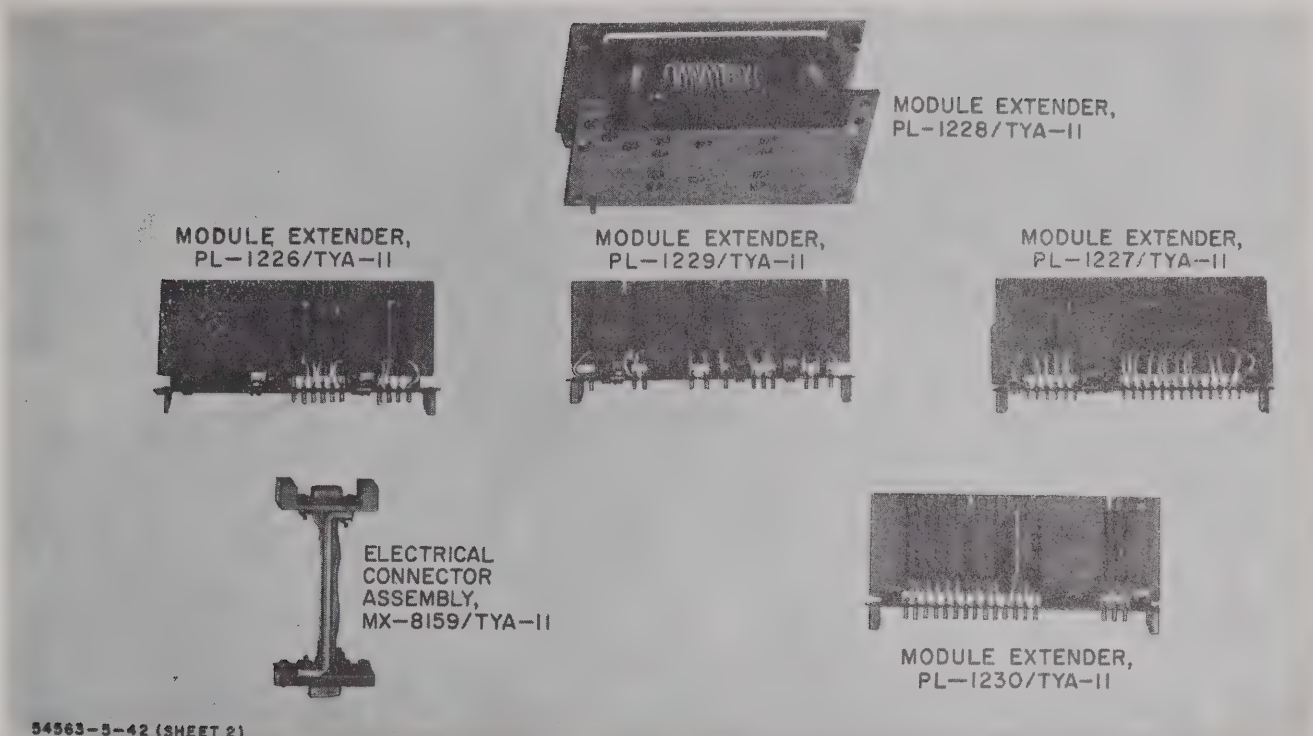


Figure 1-6. Communications Test Kit, MK-1104/TYA-11, Plug-In Unit Extenders (Sheet 2 of 2)

(b) Module Extender, PL-1232/TYA-11. Module Extender, PL-1232/TYA-11, extends any of the following printed-wiring boards from Radio Set, AN/GRC-112:

1. Hundreds, Tenths, Hundredths Switch Relay, ECI 61-00510-001
2. Tens, Unit Switch, ECI 61-00514-001
3. Relay Selector, ECI 61-00511-001
4. Remote Channel, ECI 61-00513-001.

The module extender is wired pin for pin and allows access to test points on the printed-wiring board under test.

(c) Module Extender, PL-1231/TYA-11. Module Extender, PL-1231/TYA-11, extends any of the following printed-wiring boards from either Radio Set, AN/GRC-112, or Radio Set, AN/GRC-134:

1. Vox Electronic Gate, ECI 61-00467-001

2. Vox Audio Frequency Amplifier, ECI 61-00466-001

3. Percent Modulation Detector, ECI 61-00470-001

4. Automatic Gain Control Preamplifier, ECI 61-00469-001

5. Automatic Gain Control Amplifier, ECI 61-00468-001

6. Relay Driver, ECI 61-00512-001 (Radio Set, AN/GRC-112, only).

The module extender is wired pin for pin and allows access to test points on the printed-wiring board under test.

(4) Test Accessories. Communications Test Kit, MK-1104/TYA-11, contains six test accessories used in performing maintenance on Communication Central Group, AN/TYA-11. The test accessories are described in the following paragraphs and shown in Figure 1-9.

(a) Bandpass Filter, F-1233/U. Bandpass Filter, F-1233/U, is also supplied in Communications Test Kit, MK-1102/TYA-11. Refer to paragraph 1-2a(2)(e) for a description of the bandpass filter.

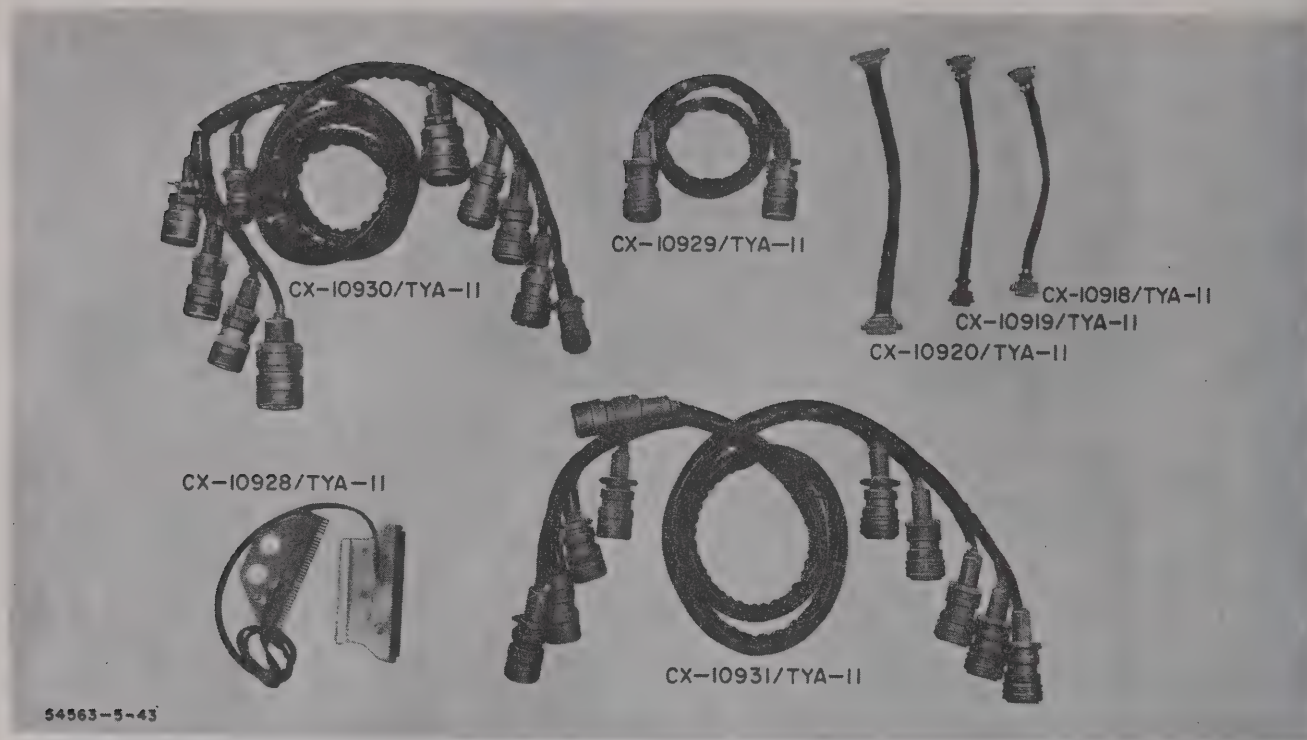


Figure 1-7. Communications Test Kit, MK-1104/TYA-11, Cable Assemblies

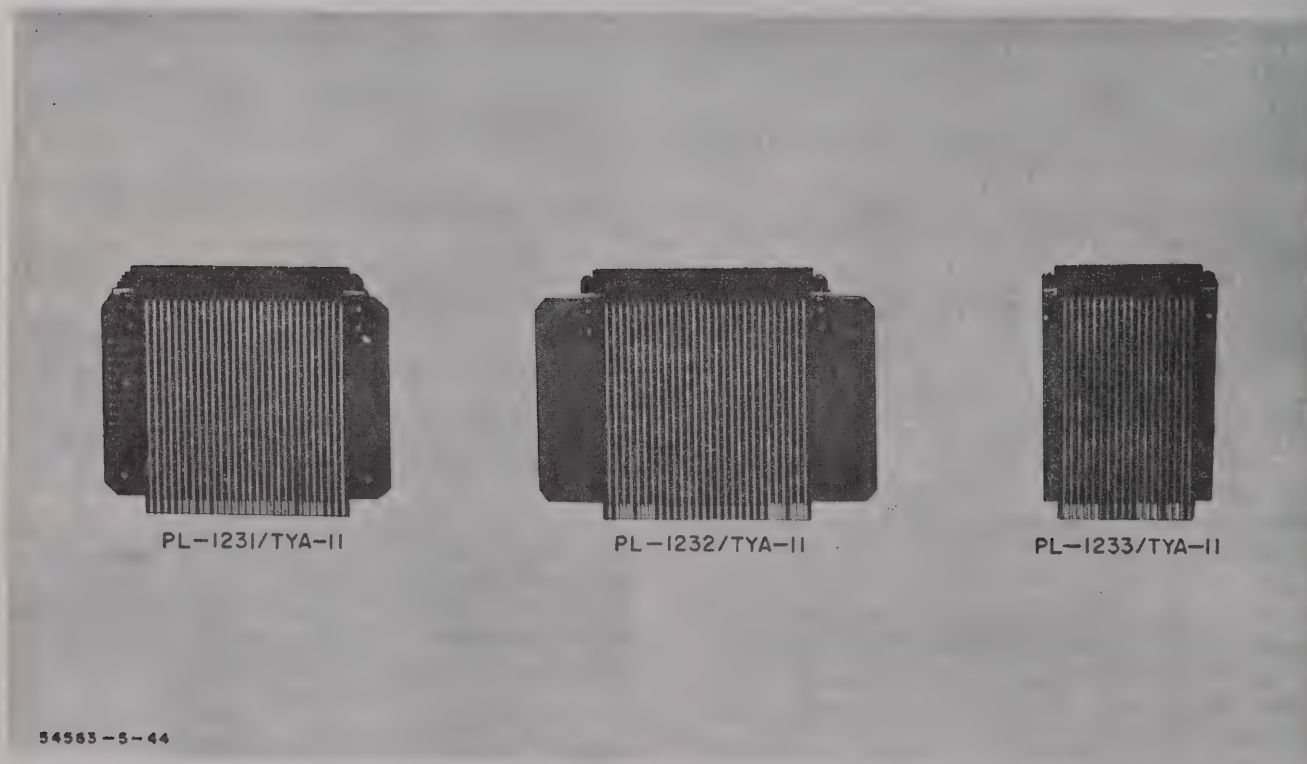


Figure 1-8. Communications Test Kit, MK-1104/TYA-11, Modulator Extenders

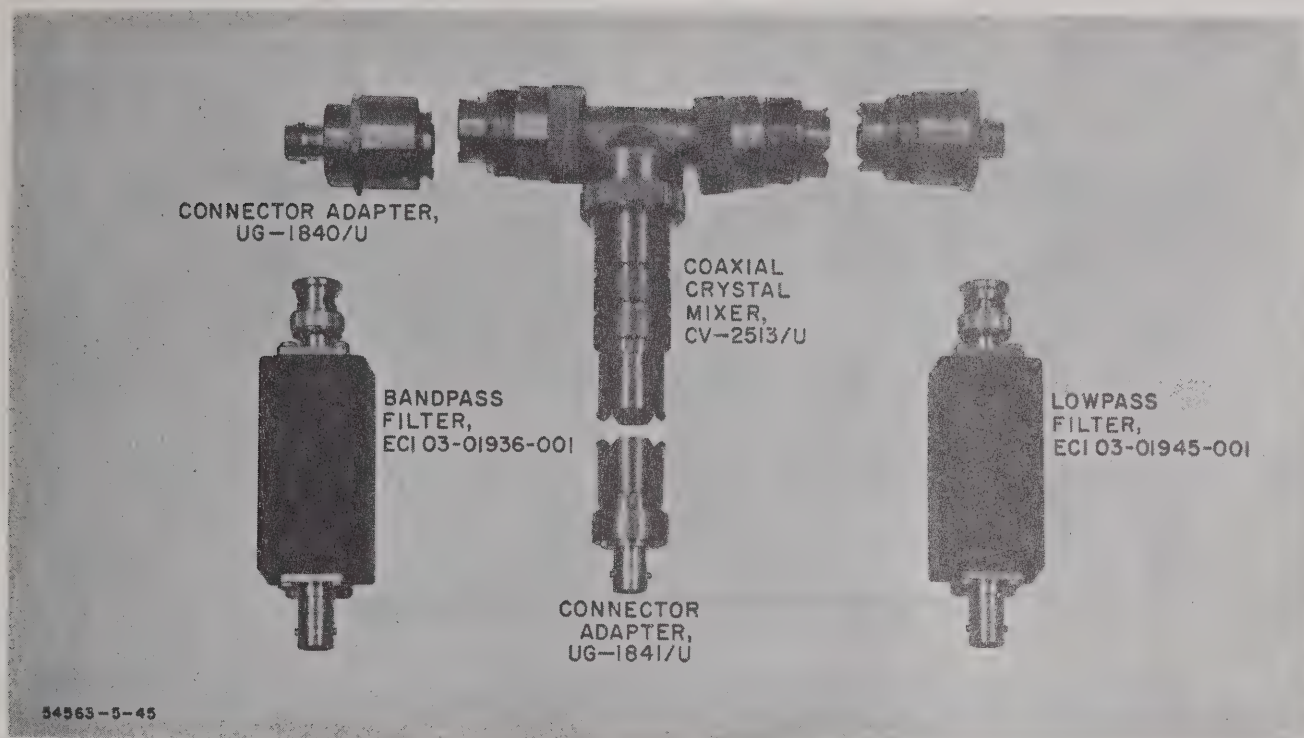


Figure 1-9. Communications Test Kit, MK-1104/TYA-11, Test Accessories

(b) Lowpass Filter, F-1234/U. Lowpass Filter, F-1234/U, is used in test setups as required when performing maintenance on Communications Central Group, AN/TYA-11. The filter passes all frequencies below 10 kc/s and attenuates all frequencies above 10 kc/s.

(c) Coaxial Crystal Mixer, CV-2513/U. Coaxial Crystal Mixer, CV-2513/U, is also supplied in Communications Test Kit, MK-1102/TYA-11. Refer to paragraph 1-2a(2)(b) for the crystal mixer description.

(d) Connector Adapter, UG-1840/U. Two Connector Adapters, UG-1840/U, are supplied in Communications Test Kit, MK-1104/TYA-11; also, two Connector Adapters, UG-1840/U, are supplied in Communications Test Kit, MK-1102/TYA-11. Refer to paragraph 1-2a(4) for the description of the connector adapters.

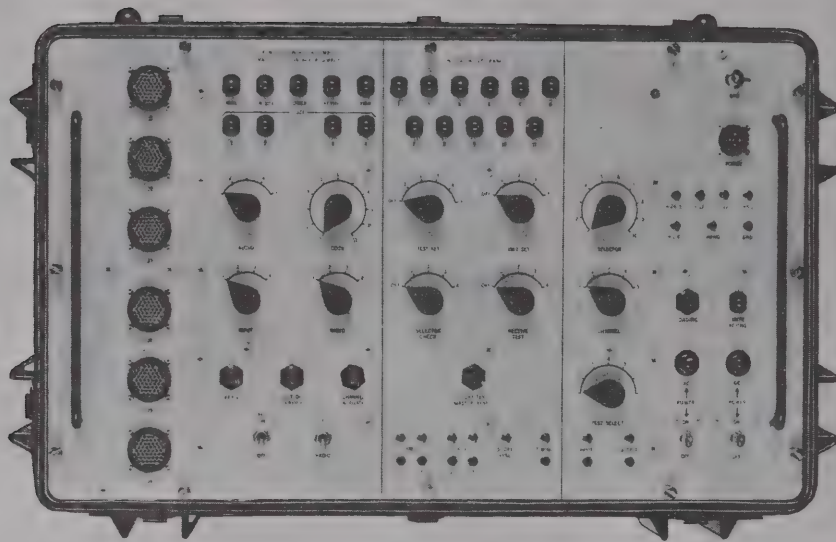
(e) Connector Adapter, UG-1841/U. Connector Adapter, UG-1841/U, is also supplied in Communications Test Kit, MK-1102/TYA-11. Refer to paragraph 1-2a(4) for the description of the connector adapter.

c. TEST SET COUPLER, MX-8154/TYA-11. Test Set Coupler, MX-8154/TYA-11, consists

of Control Group Test Set, ECI 01-00784-001, eight cable assemblies, and Transit Case, ECI 69-00173-001. The following paragraphs describe the test set and cable assemblies.

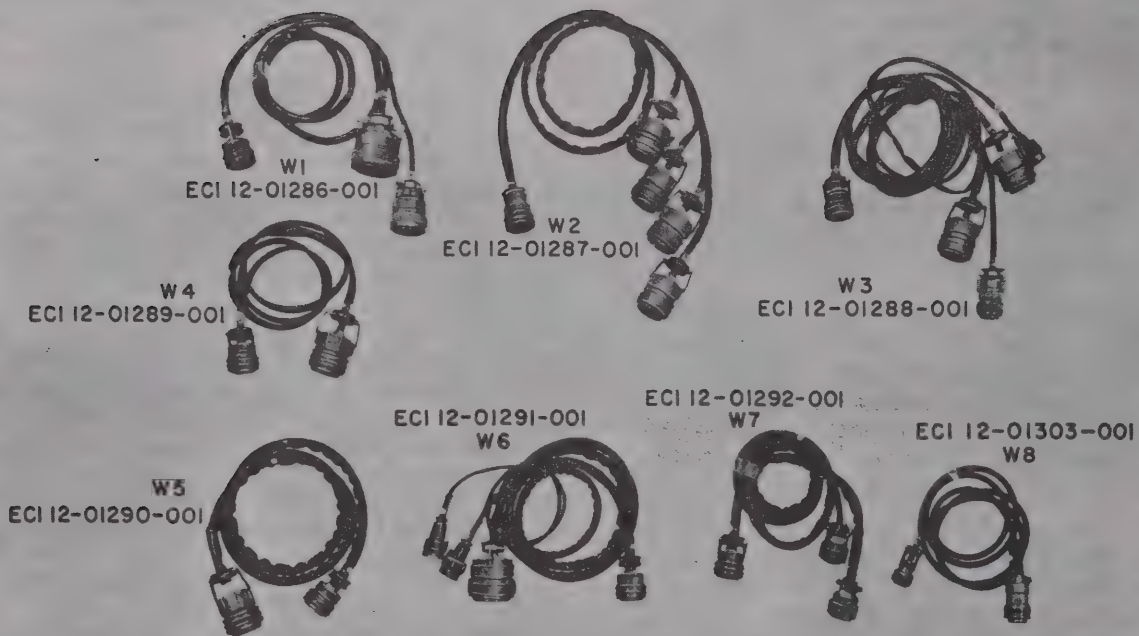
(1) Control Group Test Set Description. Control Group Test Set, ECI 01-00784-001, (Figure 1-10) provides a method of testing and maintaining assemblies of Control Power Supply Group, ECI 01-00513-001; Communications Central Group Control, C-8019/TYA-11; and Five Channel Audio Amplifier-Converter, ECI 01-00730-001. Radio Set Control Assembly, ECI 01-00507-001, Indicator Test Electrical Assembly, ECI 01-00508-001, and DC Power Supply, ECI 01-00509-001, which comprise Control Power Supply Group, ECI 01-00513-001, are tested as separate assemblies by Control Group Test Set, ECI 01-00784-001. Control Group Test Set, ECI 01-00784-001, provides the required ac and dc power, control, and test jacks to test and maintain the assemblies.

(2) Test Set Coupler, MX-8154/TYA-11, Cables. Eight interconnecting cables are provided as part of the Test Set Coupler, MX-8154/TYA-11. The cables are described in the following paragraphs and shown in Figure 1-11.



54563-5-50

Figure 1-10. Control Group Test Set ECI 01-00784-001



54563-5-46

Figure 1-11. Test Set Coupler, MX-8154/TYA-11, Cable Assemblies

(a) Branched Special Purpose Electrical Cable Assembly W1, ECI 12-01286-001. Branched Special Purpose Electrical Cable Assembly W1, ECI 12-01286-001, is one of two cables used to connect signals and power between Control Group Test Set, ECI 01-00784-001, and Radio Set Control Assembly, ECI 01-00507-001, part of Control Power Supply Group, ECI 01-00513-001. Cable W1 connector P1 mates with connector J1 on Control Group Test Set, ECI 01-00784-001, and cable W1 connectors P11 and P12 mate with Radio Set Control Assembly, ECI 01-00507-001, connectors J1 and J2, respectively.

(b) Branched Special Purpose Electrical Cable Assembly W2, ECI 12-01287-001. Branched Special Purpose Electrical Cable Assembly W2, ECI 12-01287-001, is one of two cables used to connect signals and power between Control Group Test Set, ECI 01-00784-001, and Indicator Test Electrical Assembly, ECI 01-00508-001, part of Control Power Supply Group, ECI 01-00513-001. Cable W2 connector P2 mates with connector J2 on Control Group Test Set, ECI 01-00784-001, and cable W2 connectors P11, P12, P13, and P15 mate with Indicator Test Electrical Assembly, ECI 01-00508-001, connectors J1, J2, J3, and J5, respectively.

(c) Branched Special Purpose Electrical Cable Assembly W3, ECI 12-01288-001. Branched Special Purpose Electrical Cable Assembly W3, ECI 12-01288-001, is one of two cables used to connect signals and power between Control Group Test Set, ECI 01-00784-001, and Radio Set Control Assembly, ECI 01-00507-001, part of the Control Power Supply Group, ECI 01-00513-001. Cable W3 connector P3 mates with connector J3 on Control Group Test Set, ECI 01-00784-001, and cable W3 connectors P13, P14, P15, and P16 mate with Radio Set Control Assembly, ECI 01-00507-001, connectors J3, J4, J5, and J6, respectively.

(d) Branched Special Purpose Electrical Cable Assembly W4, ECI 12-01289-001. Branched Special Purpose Electrical Cable Assembly W4, ECI 12-01289-001, is one of two cables used to connect signals and power between Control Group Test Set, ECI 01-00784-001, and Indicator Test Electrical Assembly, ECI 01-00508-001, part of the Control Power Supply Group, ECI 01-00513-001. Cable W4 connector P4 mates with connector J4 on Control Group Test Set, ECI 01-00784-001, and cable W4 connector P14 mates with Indicator Test Electrical Assembly, ECI 01-00508-001, connector J4.

(e) Branched Special Purpose Electrical Cable Assembly W5, ECI 12-01290-001. Branched Special Purpose Electrical Cable Assembly W5,

ECI 12-01290-001, is used to connect signals and power between Control Group Test Set, ECI 01-00784-001, and DC Power Supply, ECI 01-00509-001, part of Control Power Supply Group, ECI 01-00513-001. Cable W5 connector P4 mates with J4 on Control Group Test Set, ECI 01-00784-001, and cable W5 connector P11 mates with DC Power Supply, ECI 01-00509-001, connector J1.

(f) Branched Special Purpose Electrical Cable Assembly W6, ECI 12-01291-001. Branched Special Purpose Electrical Cable Assembly W6, ECI 12-01291-001, is used to connect signals and power between Control Group Test Set, ECI 01-00784-001, and Communications Central Group Control, C-8019/TYA-11. Cable W6 connector P5 mates with J5 on Control Group Test Set, ECI 01-00784-001, and cable W6 connector P17 mates with Communications Central Group Control, C-8019/TYA-11, connector J7. Cable W6 connector P11 and P12 mate with connectors J1 through J6 as required on Communications Central Group Control, C-8019/TYA-11.

(g) Branched Special Purpose Electrical Cable Assembly W7, ECI 12-01292-001. Branched Special Purpose Electrical Cable Assembly W7, ECI 12-01292-001, is used to connect signals and power between Control Group Test Set, ECI 01-00784-001, and Five Channel Audio Amplifier-Converter, ECI 01-00730-001. Cable W7 connector P6 mates with J6 on Control Group Test Set, ECI 01-00784-001, and cable W7 connectors P11 and P12 mate with Five Channel Audio Amplifier-Converter, ECI 01-00730-001, connectors J1 and J2, respectively.

(h) Special Purpose Electrical Cable Assembly W8, ECI 12-01303-001. Special Purpose Electrical Cable Assembly W8, ECI 12-01303-001, is used to connect power between a facility power source and Control Group Test Set, ECI 01-00784-001. Cable W8 connector P2 mates with a facility power source connector and cable W8 connector P1 mates with Control Group Test Set, ECI 01-00784-001, connector J7.

1-3. REFERENCE DATA. Reference data for Communications Test Kit, MK-1102/TYA-11, and Test Set Coupler, MX-8154/TYA-11, are contained in Tables 1-2 through 1-4.

1-4. EQUIPMENT SUPPLIED. Table 1-5, Equipment Supplied, lists the equipment and technical manuals which are part of Communications Test Kits, MK-1102/TYA-11 and MK-1104/TYA-11, and Test Set Coupler, MX-8154/TYA-11.

1-5. EQUIPMENT AND PUBLICATIONS REQUIRED BUT NOT SUPPLIED. The equipment

and publications required but not supplied for the installation, operation, and maintenance of Communications Test Kits, MK-1102/TYA-11 and MK-1104/TYA-11, and Test Set Coupler, MX-8154/TYA-11, are listed in Table 1-6.

1-6. FACTORY OR FIELD CHANGES. Effective as of the publication date of this technical manual there have been no factory or field changes to Communications Central Group, AN/TYA-11, maintenance equipment.

1-7. EQUIPMENT SIMILARITIES. The technical manual covers only the basic model of Commun-

ications Central Group, AN/TYA-11, maintenance equipment. Effective as of the publication date of this manual, no similar model exists.

1-8. PREPARATION FOR RESHIPMENT. Communications Test Kits, MK-1102/TYA-11 and MK-1104/TYA-11, and Test Set Coupler, MX-8154/TYA-11, are contained in transit cases. When replacing equipment in the transit cases, care must be taken to ensure the equipment is properly positioned within the case and secured as required. The transit case cover must be securely fastened and the cases properly marked for reshipment or storage, as required.

TABLE 1-2. COMMUNICATIONS TEST KIT, MK-1102/TYA-11, REFERENCE DATA

CHARACTERISTIC	SPECIFICATION
<u>OVERALL DESIGN</u>	
Intended Use	Contains part of test equipment required to maintain Communications Central Group, AN/TYA-11
Service Conditions	Complies with environmental, mechanical, and electrical requirements encountered during intended use
Environmental:	
Operating Temperature	10°C to 40°C
Nonoperating Temperature	-54°C to +74°C
Humidity	Operates normally throughout a relative humidity range from zero to 90%
Mechanical:	
Shock	Capable of withstanding shock conditions normally encountered during intended use
Vibration	Capable of withstanding vibration normally encountered during intended use
<u>TEST ADAPTER, MX-8150/TYA-11</u>	
Intended Use	Provides test jacks to allow monitoring of all active pins in connectors J2, J3, and J4 on Radio Set, AN/GRC-112
<u>TEST ADAPTER, MX-8151/TYA-11</u>	
Intended Use	Provides test jacks to allow monitoring on all active pins in connector on Radio Set, AN/GRC-134

TABLE 1-2. (Continued)

CHARACTERISTIC	SPECIFICATION
<u>TEST ADAPTER, MX-8152/TYA-11</u>	
Intended Use	Provides capability to operate and troubleshoot Antenna Coupler, CU-1406/GRC, and Tuned Cavity, FR-173/GRC
Power Output:	+28 vdc at 3 amp, maximum
Regulation	1% line, 0.5% load
Input Power:	120/208 volts $\pm 10\%$, 400 cps $\pm 5\%$, 3 phase
Operating Voltage Limits	Line to Neutral: 108 to 132 vac Line to Line: 197 to 208 vac
Operating Frequency Limits	380 to 420 cps
Duty Cycle	Continuous
Warmup Time	1 minute after power is applied
<u>TEST SET COUPLER, MX-8153/TYA-11</u>	
Intended Use	Provides capability to troubleshoot and align Synthesizer-Receivers used in Radio Sets AN/GRC-112, and AN/GRC-134
Power Output	+28 ± 1 vdc at 3 amp, maximum; -18 ± 1 vdc at 0.5 amp, maximum
Ripple	10 mv, maximum
Input Power:	120/220 volts, 400 cps, 3 phase
Operating Voltage Limits	Line to Neutral: 108 to 132 vac Line to Line: 197 to 208 vac
Operating Frequency Limits	380 to 420 cps
Duty Cycle	Continuous
<u>RADIO SET CONTROL, C-3811/AR</u>	
Intended Use	Used in conjunction with Test Set Coupler, MX-8153/TYA-11, or Test Adapter, MX-8152/TYA-11, to provide control and channeling information to unit under test
Duty Cycle	Continuous

TABLE 1-2. (Continued)

CHARACTERISTIC	SPECIFICATION
<u>FIXED ATTENUATORS, CN-1248/U, CN-1249/U, and CN-1250/U</u>	
Frequency Range:	
CN-1248/U	Dc to 3000 mcs
CN-1249/U	Dc to 300 mcs
CN-1250/U	Dc to 2500 mcs
Attenuation within Frequency Range:	
CN-1248/U	6 db
CN-1249/U	10 db
CN-1250/U	20 db
Power Rating:	
CN-1248/U	3 watts
CN-1249/U	2 watts
CN-1250/U	2 watts
Peak Power Rating	2 kw
Impedance	50 ohms
Maximum VSWR:	
CN-1248/U	1.20:1
CN-1249/U	1.20:1
CN-1250/U	1.25:1
Temperature Coefficient	0.0001
Temperature Range	-55°C to +125°C
<u>ELECTRICAL DUMMY LOAD, DA-490/U</u>	
Frequency Range	Dc to 10 gc
Impedance	50 ohms
Power Rating	2 watts
Peak Power Rating	2 kw
Maximum VSWR	1.15:1
Temperature Range	-55°C to +125°C

TABLE 1-2. (Continued)

CHARACTERISTIC	SPECIFICATION
<u>RADIO FREQUENCY DETECTOR, RF-229/U</u>	
Type	1/2 wave
Frequency Range	0.1 to 1.000 mcs
Input Impedance	50 ohms
Maximum Input	3 vrms
Output Polarity	Negative
Maximum VSWR	1.2:1
<u>COAXIAL CRYSTAL MIXER, CV-2513/U</u>	
Type	Rf broadband
<u>CONNECTOR ADAPTER, UG-1840/U</u>	
Impedance	50 ohms
Peak Voltage	500 volts
<u>CONNECTOR ADAPTER, UG-1841/U</u>	
Impedance	50 ohms
Peak Voltage	500 volts
<u>BANDPASS FILTER, F-1233/U</u>	
Bandpass	5 kc/s to 1.7 mcs
<u>ADAPTER, UG-29B/U</u>	
Connector	Female to female, type N
<u>CONNECTOR ADAPTER, UG-914/U</u>	
Connector	BNC female to BNC female
<u>CONNECTOR ADAPTER, UG-274B/U</u>	
Connector	BNC female, male, female
<u>CONNECTOR ADAPTER, UG-606/U</u>	
Connector	N female to BNC female

TABLE 1-2. (Continued)

CHARACTERISTIC	SPECIFICATION
<u>CONNECTOR ADAPTER, UG-201A/U</u> Connector	N female to BNC male
<u>CONNECTOR ADAPTER, UG-1034/U</u> Connector	BNC male to N male
<u>CONNECTOR ADAPTER, UG-335/U</u> Connector	N female to BNC male
<u>ADAPTER, UG-1108/U</u> Connector	N male to HN female
<u>ADAPTER, UG-1107/U</u> Connector	N male to HN male
<u>CONNECTOR ADAPTER, UG-559B/U</u> Connector	HN male to BNC female
<u>CONNECTOR ADAPTER, UG-1383/U</u> Connector	Miniature TNC male to BNC female
<u>ADAPTER, CONNECTOR to CONNECTOR, UG-1842/TYA-11</u> Connector	BNC to special connector
<u>CONNECTOR ADAPTER, UG-1839/U</u> Connector	Miniature TNC female to BNC female
<u>ELECTRICAL POWER CABLE ASSEMBLY W1, CX-10932/TYA-11</u> Intended Use Connector Type: P1 P2	Routes power between facility power connector and Radio Set, AN/GRC-112 MS3107-A28-9S MS3107-A20-4PW

TABLE 1-2. (Continued)

CHARACTERISTIC	SPECIFICATION
<u>ELECTRICAL POWER CABLE ASSEMBLY W2, CX-10933/TYA-11</u> Intended Use Connector Type : P1 P2	Routes power between facility power connector and Radio Set, AN/GRC-134 MS3107-A20-4PW MS3107-A20-15S
<u>SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY W3, CX-10916/TYA-11</u> Intended Use Connector Type : P1 P2	Connects Radio Set Control, C-3811/AR, to either Test Set Coupler, MX-8153/TYA-11, Test Adapter, MX-8152/TYA-11 MS24266R22B55SN MS24266R22B55PN
<u>SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY W4, CX-10917/TYA-11</u> Intended Use Connector Type : P1 P2	Connects Radio Set, AN/GRC-112, to Test Adapter, MX-8150/TYA-11 MS3107-A28-21S MS3107-A28-21PW
<u>RADIO FREQUENCY CABLE ASSEMBLY W5, W6, CG-690D/U</u> Intended Use Connector Type : P1 P2	Coaxial cable which allows routing of rf power HN N

TABLE 1-2. (Continued)

CHARACTERISTIC	SPECIFICATION
<u>RADIO FREQUENCY CABLE ASSEMBLY W7, CG-3489/TYA-11</u> Intended Use Connector Type: P1 P2	Coaxial cable which allows routing of rf power LT N
<u>SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY W8, CX-11733/TYA-11</u> Intended Use Connector Type: P1 P2 P3	Connects Tuned Cavity, FR-173/GRC, to Test Adapter, MX-8153/TYA-11 PF-040A MS3101-A28-21P MS3101-A24-28P
<u>MODULE EXTENDER, PL-1233/TYA-11</u> Intended Use	Extends printed-wiring boards in Five Channel Audio Amplifier-Converter, ECI 01-00730-001, and assemblies in Control Power Supply Group, ECI 01-00513-001

TABLE 1-3. COMMUNICATIONS TEST KIT, MK-1104/TYA-11, REFERENCE DATA

CHARACTERISTIC	SPECIFICATION
<u>OVERALL DESIGN</u> Intended Use Service Conditions Environmental Operating Temperature Nonoperating Temperature	Contains part of test equipment required to maintain Communications Central Group, AN/TYA-11 Complies with environmental, mechanical, and electrical requirements encountered during intended use 0°C to +50°C -54°C to +74°C

TABLE 1-3. (Continued)

CHARACTERISTIC	SPECIFICATION
<u>OVERALL DESIGN (Cont)</u>	
Humidity	0 to 90%
Mechanical:	
Shock	Capable of withstanding shock conditions normally encountered during intended use
Vibration	Capable of withstanding vibration conditions normally encountered during intended use
<u>MODULE EXTENDER, PL-1228/TYA-11</u>	
Intended Use	Extends Radio Frequency Oscillator, ECI 03-01088-001, from either Radio Set, AN/GRC-112, or Radio Set, AN/GRC-134
<u>TEST ADAPTER, MX-8158/TYA-11</u>	
Intended Use	Allows monitoring of Five Channel Audio Amplifier-Converter, ECI 01-00730-001, inputs and outputs
<u>MODULE EXTENDER, PL-1227/TYA-11</u>	
Intended Use	Extends Radio Frequency AM. Detector, ECI 03-01092-002, from either Radio Set, AN/GRC-112, or Radio Set, AN/GRC-134
<u>MODULE EXTENDER, PL-1226/TYA-11</u>	
Intended Use	Extends Intermediate Frequency Amplifier, ECI 03-01090-001, from either Radio Set, AN/GRC-112, or Radio Set, AN/GRC-134
<u>MODULE EXTENDER, PL-1230/TYA-11</u>	
Intended Use	Extends Intermediate Frequency Amplifier, ECI 03-01091-001, from either Radio Set, AN/GRC-112, or Radio Set, AN/GRC-134
<u>MODULE EXTENDER, PL-1229/TYA-11</u>	
Intended Use	Extends Radio Frequency FM Detector, ECI 03-01093-001, from Radio Set, AN/GRC-112

TABLE 1-3. (Continued)

CHARACTERISTIC	SPECIFICATION
<u>ELECTRICAL CONNECTOR ASSEMBLY, MX-8159/TYA-11</u> Intended Use	Extends Voltage Regulator Set, ECI 03-01094-001, from either Radio Set, AN/GRC-112, or Radio Set, AN/GRC-134
<u>SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY, CX-10920/TYA-11</u> Intended Use Connector Type: P1 P2	Extends Electronic Control Amplifier, ECI 03-01592-001, from either Radio Set, AN/GRC-112, or Radio Set, AN/GRC-134 ECI 16-00026-003 ECI 16-00026-004
<u>SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY, CX-10919/TYA-11</u> Intended Use Connector Type: P1 P2	Extends either Radio Frequency FSK Modulator, ECI 03-01106-001, from Radio Set, AN/GRC-112, or Radio Frequency Oscillator, ECI 03-01166-001, from Radio Set AN/GRC-134 ECI 16-00609-004 ECI 16-00608-005
<u>SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY, CX-10918/TYA-11</u> Intended Use Connector Type: P1 P2	Extends Radio Frequency AM. Modulator, ECI 03-01069-003, from either Radio Set, AN/GRC-112, or Radio Set, AN/GRC-134 ECI 16-00609-004 ECI 16-00608-005
<u>SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY, CX-10928/TYA-11</u> Intended Use Connector Type: P2	Extends Power Supply Subassembly, ECI 03-01390-001, from DC Power Supply, ECI 01-00509-001, part of Control Power Supply Group, ECI 01-00513-001 ECI 16-00563-001

TABLE 1-3. (Continued)

CHARACTERISTIC	SPECIFICATION
<u>SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY, CX-10929/TYA-11</u> Intended Use Connector Type: P1 P2	Extends DC Power Supply, ECI 01-00509-001, from Control Power Supply Group, ECI 01-00513-001 MS3101-A28-00PX MS3106-A28-11SX
<u>BRANCHED SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY, CX-10930/TYA-11</u> Intended Use Connector Type: P1 P2 P3 P4 P5 P6 P7 P8 P9 P10	Extends Radio Set Control Assembly, ECI 01-00507-001, from Control Power Supply Group, ECI 01-00513-001 MS3101-A36-8S MS3101-A28-12S MS3101-A28-21SY MS3101-A28-21SZ MS3101-A20-27P MS3106-A36-8P MS3106-A28-12P MS3106-A28-21PY MS3106-A28-21PZ MS3106-A20-27S
<u>BRANCHED SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY, CX-10931/TYA-11</u> Intended Use Connector Type: P1 P2 P3 P4	Extends Indicator Test Electrical Assembly, ECI 01-00508-001, from Control Power Supply Group, ECI 01-00513-001 MS3101-A28-21S MS3101-A28-21PW MS3101-A28-21SW MS3101-A28-21SX

TABLE 1-3. (Continued)

CHARACTERISTIC	SPECIFICATION
<u>BRANCHED SPECIAL PURPOSE ELEC- TRICAL CABLE ASSEMBLY, CX-10931/ TYA-11 (Cont)</u> Connector Type: (Cont) P5 P6 P7 P8 P9 P10	 MS3101-A28-21P MS3106-A28-21SW MS3106-A28-21SW MS3106-A28-21PW MS3106-A28-21PX MS3106-A28-21S
<u>MODULE EXTENDER, PL-1233/TYA-11</u>	Refer to Table 1-2
<u>MODULE EXTENDER, PL-1232/TYA-11</u> Intended Use	Extends following printed-wiring boards from Radio Set, AN/GRC-112: (1) Hundreds, Tenths, Hundredths, Switch Relay, ECI 61-00510-001 (2) Tens, Unit Switch, ECI 61-00514-001 (3) Relay Selector, ECI 61-00511-001 (4) Remote Channel, ECI 61-00513-001
<u>MODULE EXTENDER, PL-1231/TYA-11</u> Intended Use	Extends following printed-wiring boards from either Radio Set, AN/GRC-112, or Radio Set, AN/GRC-134: (1) Vox Electronic Gate, ECI 61-00467-001 (2) Vox Audio Frequency Amplifier, ECI 61-00466-001 (3) Percent Modulation Detector, ECI 61- 00470-001 (4) Automatic Gain Control Preamplifier, ECI 61-00469-001 (5) Automatic Gain Control Amplifier, ECI 61-00468-001 (6) Relay Driver, ECI 61-00512-001 (Radio Set, AN/GRC-112, only)

TABLE 1-3. (Continued)

CHARACTERISTIC	SPECIFICATION
<u>BANDPASS FILTER, F-1233/U</u>	Refer to Table 1-2
<u>LOWPASS FILTER, F-1234/U</u>	
Cutoff Frequency	10 kc/s
<u>COAXIAL CRYSTAL MIXER, CV-2513/U</u>	Refer to Table 1-2
<u>CONNECTOR ADAPTER, UG-1840/U</u>	Refer to Table 1-2
<u>CONNECTOR ADAPTER, UG-1841/U</u>	Refer to Table 1-2

TABLE 1-4. TEST SET COUPLER, MX-8154/TYA-11, REFERENCE DATA

CHARACTERISTIC	SPECIFICATION
<u>OVERALL DESIGN</u>	
Intended Use	<p>Tests the following :</p> <ul style="list-style-type: none"> (1) Radio Set Control Assembly, ECI 01-00507-001 (2) Indicator Test Electrical Assembly, ECI 01-00508-001 (3) DC Power Supply, ECI 01-00509-001 (4) Communications Central Group Control, C-8019/TYA-11 (5) Five Channel Audio Amplifier-Converter, ECI 01-00730-001 <p>Note</p> <p>THE FIRST THREE LISTED UNITS ARE PART OF CONTROL POWER SUPPLY GROUP, ECI 01-00513-001.</p>
Service Conditions	Complies with environmental, mechanical, and electrical requirements encountered during intended use
Environmental :	
Temperature	0°C to +50°C
Relative Humidity	Up to 90%

TABLE 1-4. (Continued)

CHARACTERISTIC	SPECIFICATION
<u>OVERALL DESIGN (Cont)</u> Mechanical: Shock Vibration: Electrical: Power Voltage Limits Frequency Limits Duty Cycle Warmup	 Amplitude: $\pm 10\%$ Duration: $\pm 10\%$ Amplitude: $\pm 20\%$ Frequency: ± 1 cps 120 volts, 400 cps, 1 phase, 2-wire, at 160 va, maximum 120 ± 6 vac 400 ± 20 cps Continuous 20 minutes
<u>BRANCHED SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY W1, ECI 12-01286-001</u> Intended Use Connector Type: P1 P11 P12	 One of two cables used to connect Control Group Test Set, ECI 01-00784-001, to Radio Set Control Assembly, ECI 01-00507-001, part of Control Power Supply Group, ECI 01-00513-001 MS24266-R22B55PN MS3106-R36-8P MS3106-R28-12P
<u>BRANCHED SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY W2, ECI 12-01287-001</u> Intended Use	 One of two cables used to connect Control Group Test Set, ECI 01-00784-001, to Indicator Test Electrical Assembly, ECI 01-508-001, part of Control Power Supply Group, ECI 01-00513-001

TABLE 1-4. (Continued)

CHARACTERISTIC	SPECIFICATION
<p><u>BRANCHED SPECIAL PURPOSE ELEC- TRICAL CABLE ASSEMBLY W2, ECI 12-01287-001 (Cont)</u></p> <p>Connector Type:</p> <p>P2</p> <p>P11</p> <p>P12</p> <p>P13</p> <p>P15</p>	<p>MS24266-R22B55P6</p> <p>MS3106-R28-21P</p> <p>MS3106-R28-21SW</p> <p>MS3106-R28-21PW</p> <p>MS3106-R28-21S</p>
<p><u>BRANCHED SPECIAL PURPOSE ELEC- TRICAL CABLE ASSEMBLY W3, ECI 12-01288-001</u></p> <p>Intended Use</p> <p>Connector Type:</p> <p>P3</p> <p>P13</p> <p>P14</p> <p>P16</p>	<p>One of two cables used to connect Control Group Test Set, ECI 01-00784-001, to Radio Set Control Assembly, ECI 01-00507-001, part of Control Power Supply Group, ECI 01-00513-001</p> <p>MS24266-R22-P55P7</p> <p>MS3106-R28-21PY</p> <p>MS3106-R28-21PZ</p> <p>U-77/U</p>
<p><u>BRANCHED SPECIAL PURPOSE ELEC- TRICAL CABLE ASSEMBLY W4, ECI 12-01289-001</u></p> <p>Intended Use</p> <p>Connector Type:</p> <p>P4</p> <p>P14</p>	<p>One of two cables used to connect Control Group Test Set, ECI 01-00784-001, to Indicator Test Electrical Assembly, ECI 01-00508-001, part of Control Power Supply Group, ECI 01-00513-001</p> <p>MS24266-R22-B55P8</p> <p>MS3106-R28-21PX</p>

TABLE 1-4. (Continued)

CHARACTERISTIC	SPECIFICATION
<u>BRANCHED SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY W5, ECI 12-01290-001</u> Intended Use Connector Type: P4 P11	Used to connect Control Group Test Set, ECI 01-00784-001, to DC Power Supply, ECI 01-00509-001, part of Control Power Supply Group, ECI 01-00513-001 MS24266-R22-B55P8 MS3106-R28-11SX
<u>BRANCHED SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY W6, ECI 12-01291-001</u> Intended Use Connector Type: P5 P11 P12 P17	Used to connect Control Group Test Set, ECI 01-00784-001, to Communications Central Group Control, C-8019/TYA-11 MS24266-R22-B55P9 U-77/U U-77/U MS3106-R36-8S
<u>BRANCHED SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY W7, ECI 12-01292-001</u> Intended Use Connector Type: P6 P11 P12	Used to connect Control Group Test Set, ECI 01-00784-001, to Five Channel Audio Amplifier-Converter, ECI 01-00730-001 MS24266-R22-B55P10 KPT06-BV22-55S KPT06-BV20-41P
<u>SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY W8, ECI 12-01303-001</u> Intended Use Connector Type: P1 P2	Used to connect Control Group Test Set, ECI 01-00784-001, to facility power MS24266-R14-B4SN MS3107-A20-4PW

TABLE 1-5. EQUIPMENT SUPPLIED

QUANTITY PER EQUIPMENT	NOMENCLATURE		UNIT NO.	OVERALL DIMENSIONS (IN.)			VOLUME (CU FT)	WEIGHT (LB)
	NAME	DESIGNATION		HEIGHT	WIDTH	DEPTH		
1	Communications Test Kit	MK-1102/TYA-11		16.25	37.25	27.25		110
1	Transit Case	ECI 67-02422-001		16.25	37.25	27.25		
1	Test Adapter	MX-8150/TYA-11						
1	Test Adapter	MX-8151/TYA-11						
1	Test Adapter	MX-8152/TYA-11						
1	Test Set Coupler	MX-8153/TYA-11						
1	Radio Set Control	C-3811/AR		4.875	5.750 ±0.135	5.7245		
1	Module Extender	PL-1233/TYA-11						
1	Fixed Attenuator	CN-1248/U		0.83 ±0.01	-	2.20 ±0.05		
2	Fixed Attenuators	CN-1249/U		0.83 ±0.01	-	2.20 ±0.05		
1	Fixed Attenuator	CN-1250/U		0.83 ±0.01	-	2.97 ±0.06		
1	Coaxial Crystal Mixer	CV-2513/U			3 35 64	3 57 64		
1	Electrical Dummy Load	DA-490/U		0.83 ±0.03	-	1.39 ±0.03		3.375 ±0.0625
1	Radio Frequency Detector	ECI 69-00163-001		0.75	-	3.0		
1	Connector Adapter	UG-1842/TYA-11		2.88	0.50			
1	Bandpass Filter	F-1233/U						

TABLE 1-5. (Continued)

QUANTITY PER EQUIPMENT	NOMENCLATURE		UNIT NO.	OVERALL DIMENSIONS (IN.)			VOLUME (CU FT)	WEIGHT (LB)
	NAME	DESIGNATION		HEIGHT	WIDTH	DEPTH		
1	Fixed Mounting Rotating Counter	ECI 03-01937-001		-	-	18 ±1		
1	Special Purpose Electrical Cable Assembly W3	CX-10916/TYA-11		-	-	60 ±2		
1	Special Purpose Electrical Cable Assembly W4	CX-10917/TYA-11		-	-	48 ±1		
2	Radio Frequency Cable Assembly W5, W6	CG-690D/U		-	-	60 ±2		
1	Electrical Power Cable Assembly W1	CX-10932/TYA-11		-	-	48 ±1		
1	Radio Frequency Cable Assembly W7	CG-3489/TYA-11		-	-	60 ±2		
1	Electrical Power Cable Assembly W2	CX-10933/TYA-11		-	-	13 ±2		
1	Special Purpose Electrical Cable Assembly W8	CX-11733/TYA-11		-	-	1.544		
2	Connector Adapter	UG-1840/U		1.156	-	19/16		
1	Connector Adapter	UG-1841/U		7/16	-	1.000		
1	Connector Adapter	UG-1838/U		7/16	-	15/16		
1	Connector Adapter	UG-1839/U		0.656	-	1.750		
1	Adapter	UG-29B/U		0.781 ±0.015	-			
1	Connector Adapter	UG-201A/U		1.281	-	1.031		
1	Connector Adapter	UG-274B/U			-			

TABLE 1-5. (Continued)

QUANTITY PER EQUIPMENT	NOMENCLATURE		UNIT NO.	OVERALL DIMENSIONS (IN.)			VOLUME (CU FT)	WEIGHT (LB)
	NAME	DESIGNATION		HEIGHT	WIDTH	DEPTH		
1	Connector Adapter	UG-335/U		1.000 -0.015	-	1.734		
1	Connector Adapter	UG-559B/U		31-32	-	1-17/32		
1	Connector Adapter	UG-606/U		3/4 ±1/4	-	1-47/64		
1	Connector Adapter	UG-914/U		0.436 ±0.0004	-	1.281		
1	Connector Adapter	UG-1034/U						
1	Adapter	UG-1107/U		7/8	-	1-27/32		
1	Adapter	UG-1108/U		13/16	-	1-9/16		
1	Communications Test Kit	MK-1104/TYA-11		12.38	26	20		70
1	Test Kit Case	CY-6520/TYA-11		12.38	26	20		
1	Module Extender	PL-1228/TYA-11						
1	Test Adapter	MX-8158/TYA-11						
1	Module Extender	PL-1227/TYA-11						
1	Module Extender	PL-1226/TYA-11						
1	Module Extender	PL-1230/TYA-11						
1	Module Extender	PL-1229/TYA-11						
1	Electrical Connector Assembly	MX-8159/TYA-11						
1	Special Purpose Electrical Cable Assembly	CX-10920/TYA-11				12 ±2		

TABLE 1-5. (Continued)

QUANTITY PER EQUIPMENT	NOMENCLATURE		UNIT NO.	OVERALL DIMENSIONS (IN.)			VOLUME (CU FT)	WEIGHT (LB)
	NAME	DESIGNATION		HEIGHT	WIDTH	DEPTH		
1	Module Extender	PL-1233/TYA-11						
1	Module Extender	PL-1232/TYA-11						
1	Module Extender	PL-1231/TYA-11						
1	Bandpass Filter	F-1233/U						
1	Lowpass Filter	F-1234/U						
1	Coaxial Crystal Mixer	CV-2513/U			3-35/64	3-57/64		
2	Connector	UG-1840/U		1.156		1.544		
1	Connector Adapter	UG-1841/U		1-3/16		1.000		
1	Special Purpose Electrical Cable Assembly	CX-10919/TYA-11				12 ±2		
1	Special Purpose Electrical Cable Assembly	CX-10918/TYA-11				12 ±2		
1	Special Purpose Electrical Cable Assembly	CX-10928/TYA-11				36 ±1		
1	Special Purpose Electrical Cable Assembly	CX-10929/TYA-11				48 ±2		
1	Branched Special Purpose Electrical Cable Assembly	CX-10930/TYA-11				72 ±3		
1	Branched Special Purpose Electrical Cable Assembly	CX-10931/TYA-11				60 ±2		
1	Test Set Coupler	MX-8154/TYA-11		17.71	26.18	16.15		90
1	Transit Case	ECI 69-00173-001		17.71	26.18	16.15		

TABLE 1-5. (Continued)

QUANTITY PER EQUIPMENT	NOMENCLATURE		UNIT NO.	OVERALL DIMENSIONS (IN.)			VOLUME (CU FT)	WEIGHT (LB)
	NAME	DESIGNATION		HEIGHT	WIDTH	DEPTH		
1	Branched Special Purpose Electrical Cable Assembly W1	ECI 12-01286-001				72 ±3		
1	Branched Special Purpose Electrical Cable Assembly W2	ECI 12-01287-001				72 ±2		
1	Branched Special Purpose Electrical Cable Assembly W3	ECI 12-01288-001				72 ±3		
1	Branched Special Purpose Electrical Cable Assembly W4	ECI 12-01289-001				60 ±2		
1	Branched Special Purpose Electrical Cable Assembly W5	ECI 12-01290-001				60 ±3		
1	Branched Special Purpose Electrical Cable Assembly W6	ECI 12-01291-001				84 ±3		
1	Branched Special Purpose Electrical Cable Assembly W7	ECI 12-01292-001				72 ±2		
1	Special Purpose Electrical Cable Assembly W8	ECI 12-01303-001				72 ±3		
1	Electronic Equipment Manual For Communications Test Kit, MK-1102/TYA-11, Communications Test Kit, MK-1104/TYA-11, and Test Set Coupler, MX-8154/TYA-11	TM-6625-45/2			8-1/2	11		
1	Instrument Calibration for Test Set Coupler, MX-8154/TYA-11	TM-04165A/45-1			8-1/2	11		

TABLE 1-6. EQUIPMENT AND PUBLICATIONS REQUIRED BUT NOT SUPPLIED

QUANTITY PER EQUIPMENT	NOMENCLATURE		REQUIRED USE	CHARACTERISTIC
	NAME	DESIGNATION		
2	Signal Generator	AN/URM-127	Troubleshooting and Maintenance	Frequency range: 300 to 3000 cps
2	Electronic Voltmeter	ME-30B	Voltage Measurements	Voltage range: 0 to 3 vrms
1	Oscilloscope	Fairchild 765MH	Troubleshooting and Maintenance	Waveform Observations
1	Plug-In Unit	Fairchild 76-02A	Used with Oscilloscope (Fairchild 765MH)	Waveform Observations
1	Electronic Multimeter	AN/USM-116	Troubleshooting and Maintenance	General Purpose
1	Digital Voltmeter	Hewlett-Packard 3440A (With Range Selector HP 3442A)	DC Voltage Measurements	Voltage Range: 0 to 999.9 Volts
1	Termaline Wattmeter	Bird 6835	Thru-line Wattmeter Load	Rf Power Range: 50 to 1200 watts
4	Battery	Burgess Type 718	Troubleshooting and Maintenance	6 Volts
2	Potentiometer	-	Troubleshooting and Maintenance	1000 Ohms, 2 Watts
1	Signal Generator	AN/USM-44	Troubleshooting and Maintenance	Frequency Range: 225.00 to 399.95 mcs
1	Fuse	MX-1730/U	Used with Signal Generator AN/USM-44 to Protect Output Attenuator	Frequency Range: 225.00 to 399.95 mcs
1	FM Signal Generator	Waltham 102 FSK	Troubleshooting and Maintenance	Frequency Range: 225.00 to 399.95 mcs
1	Frequency Counter	Hewlett-Packard 5245L	Frequency Measurement	Frequency Range: 225.00 to 399.95 mcs, 46.250 to 89.9875 mcs, and 34.875 mcs
1	Frequency Converter	Hewlett-Packard 5253B	Used with Frequency Counter to extend range	Frequency Range: 225.00 to 399.95 mcs, 46.250 to 89.9875 mcs, 34.875 mcs

TABLE 1-6. (Continued)

QUANTITY PER EQUIPMENT	NOMENCLATURE		REQUIRED USE	CHARACTERISTIC
	NAME	DESIGNATION		
1	Distortion Analyzer	Hewlett-Packard 330B	Checking Modulation distortion	Frequency Range: 300 to 3000 cps
1	Multimeter	AN/PSM-4	Troubleshooting and Maintenance	Voltage Range: 1300 vdc
1	Standing Wave Indicator	Hewlett-Packard 415B	Standing Wave Ratio Measurement	Frequency Range: 225.00 to 399.95 mcs
1	ThruLine Wattmeter	Bird 43	Rf Power Measurement	Rf Power Range: 50 to 1000 Watts Impedance: 50 Ohms
1	Plug-In Detector	Bird 100D	Used with ThruLine Wattmeter	Rf Power Range: 50 to 100 Watts
1	Accessory Kit	MK-859/GRC	Used to Extend Modules	-

SECTION 2

INSTALLATION

2-1. UNPACKING AND HANDLING. Communications Test Kits, MK-1102/TYA-11 and Test Set Coupler, MX-8154/TYA-11, are each contained in a transit case.

2-2. POWER REQUIREMENTS. Table 2-1, Power Requirements, lists the test equipment which is part of the Communications Central Group, AN/TYA-11, maintenance equipment which requires primary power for operation. Power requirements for the equipment being tested are contained in the appropriate equipment manual.

2-3. SITE SELECTION. Communications Central Group, AN/TYA-11, maintenance equipment operation site requires ample space to position the prime as well as test equipment. The site requires suitable work bench area and storage area. The site also requires power facilities, specified in paragraph 2-2, and test equipment required but not supplied.

2-4. INSTALLATION REQUIREMENTS. Since Communications Test Kits, MK-1102/TYA-11 and MK-1104/TYA-11, and Test Set Coupler, MX-8154/TYA-11, are portable, there are no special installation requirements. Figures 2-1, 2-2, and 2-3, show the dimensions of the units.

2-5. CABLE ASSEMBLIES. A list of cables, including the number of active and spare conductors, and power ratings is shown in Table 2-2.

2-6. INSPECTION AND ADJUSTMENT. Communications Test Kits, MK-1102/TYA-11 and MK-1104/TYA-11, and the Test Set Coupler, MX-8154/TYA-11, must be inspected to ensure that no equipment is missing and no physical damage has occurred during shipment. If power supplies contained in Test Adapter, MX-8152/TYA-11, Test Set Coupler, MX-8153/TYA-11, (both fixtures are part of Communications Test Kit, MK-1102/TYA-11), or Test Set Coupler, MX-8154/TYA-11, require adjustment, reference shall be made to the applicable procedures contained in Section 5 of this manual.

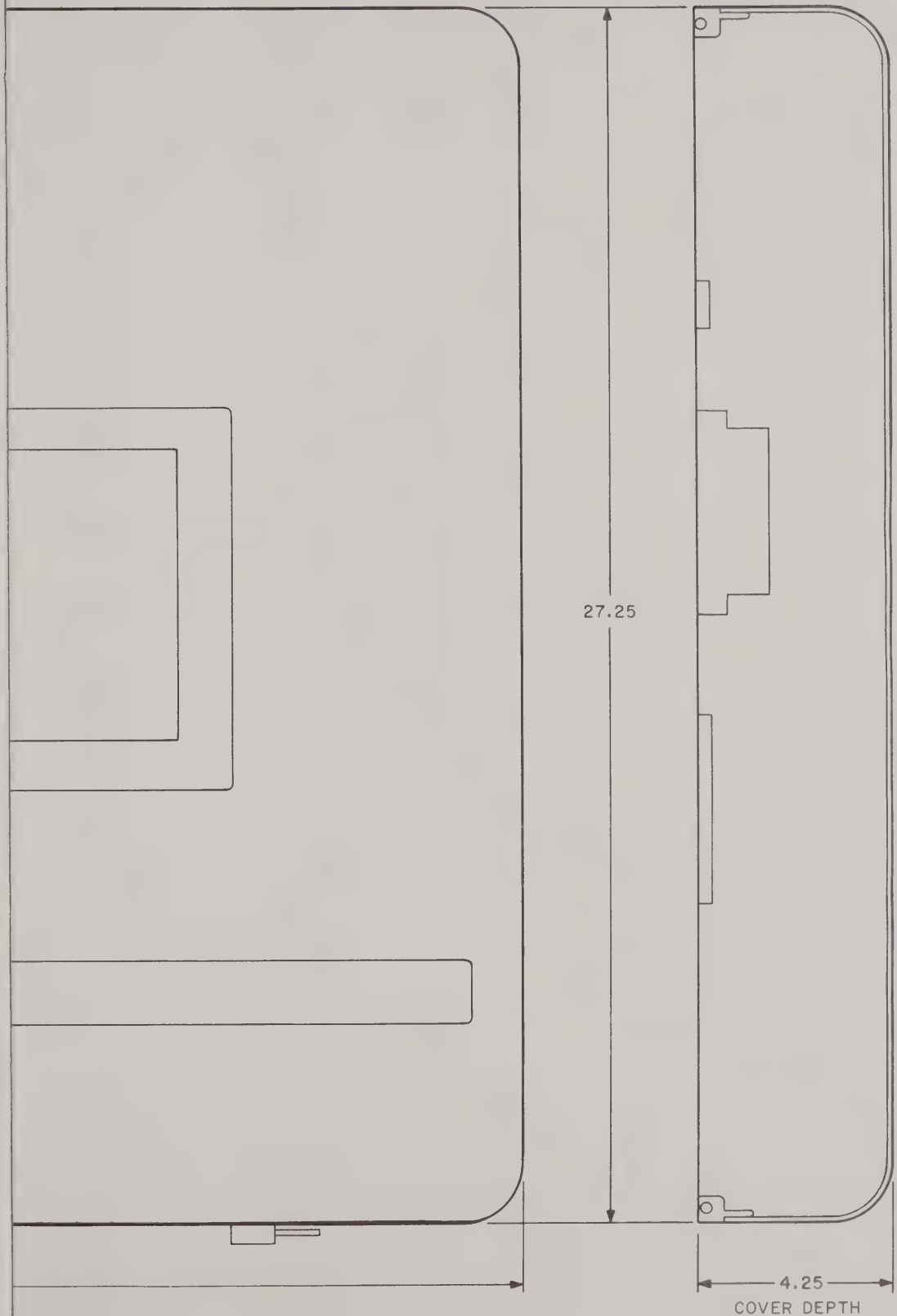
2-7. INTERFERENCE REDUCTION. Communications Central Group, AN/TYA-11, maintenance equipment should operate away from other equipment or systems such as generators, electric motors, power distribution and control centers, and radio and radar installations. All equipment must be properly grounded and all rf leads kept as short as possible.

TABLE 2-1. POWER REQUIREMENTS

TEST EQUIPMENT	POWER REQUIREMENT
<u>Communications Test Kit,</u> <u>MK-1102/TYA-11</u>	
Test Adapter, MX-8152/ TYA-11	115 volts; phases A, B, neutral
Test Set Coupler, MX-8153/ TYA-11	115 volts; phase A, B, neutral
<u>Test Set Coupler, MX-8154/</u> <u>TYA-11</u>	120 volts, 400 cps, 1 phase, 165 va, maximum

TABLE 2-2. CABLE ASSEMBLIES

CABLE	ACTIVE CONDUCTORS	SPARE CONDUCTORS	POWER
CX-19016/TYA-11	28	None	-
CX-10917/TYA-11	22	None	-
CX-10932/TYA-11	4	None	4 kva
CX-10933/TYA-11	4	None	800 va
CX-10929/TYA-11	20	None	-
CX-10920/TYA-11	23	None	-
CX-10919/TYA-11	14	None	-
CX-10918/TYA-11	9	None	-
CX-10928/TYA-11	6	None	-
CX-10930/TYA-11	122	None	-
CX-10931/TYA-11	145	None	-
ECI 12-01286-001	49	None	-
ECI 12-01287-001	49	None	-
ECI 12-01288-001	54	None	-
ECI 12-01289-001	24	None	-
ECI 12-01290-001	17	None	-
ECI 12-01291-001	46	None	-
ECI 12-01292-001	51	None	-
ECI 12-01303-000	2	None	165 va
CG-690D/G	1	None	-
CG-690D/G	1	None	-
CX-11733/TYA-11	24	None	-



2-1. Communications Test Kit, MK-1102/TYA-11, Installation Drawing

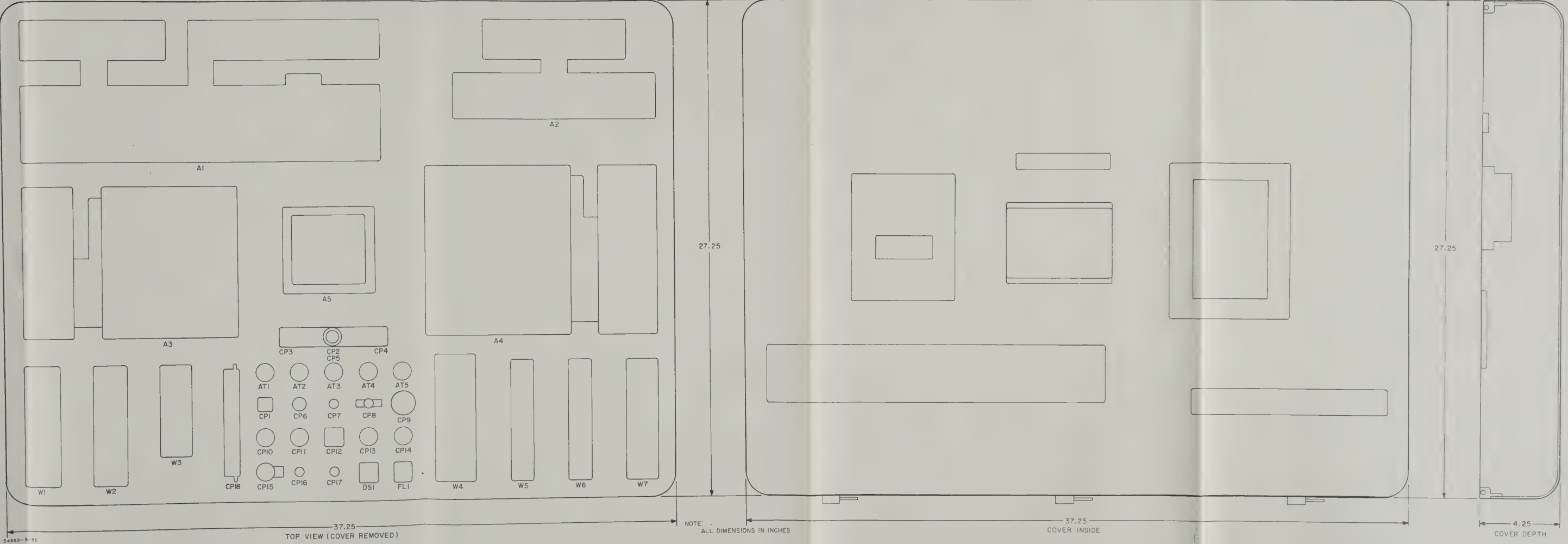
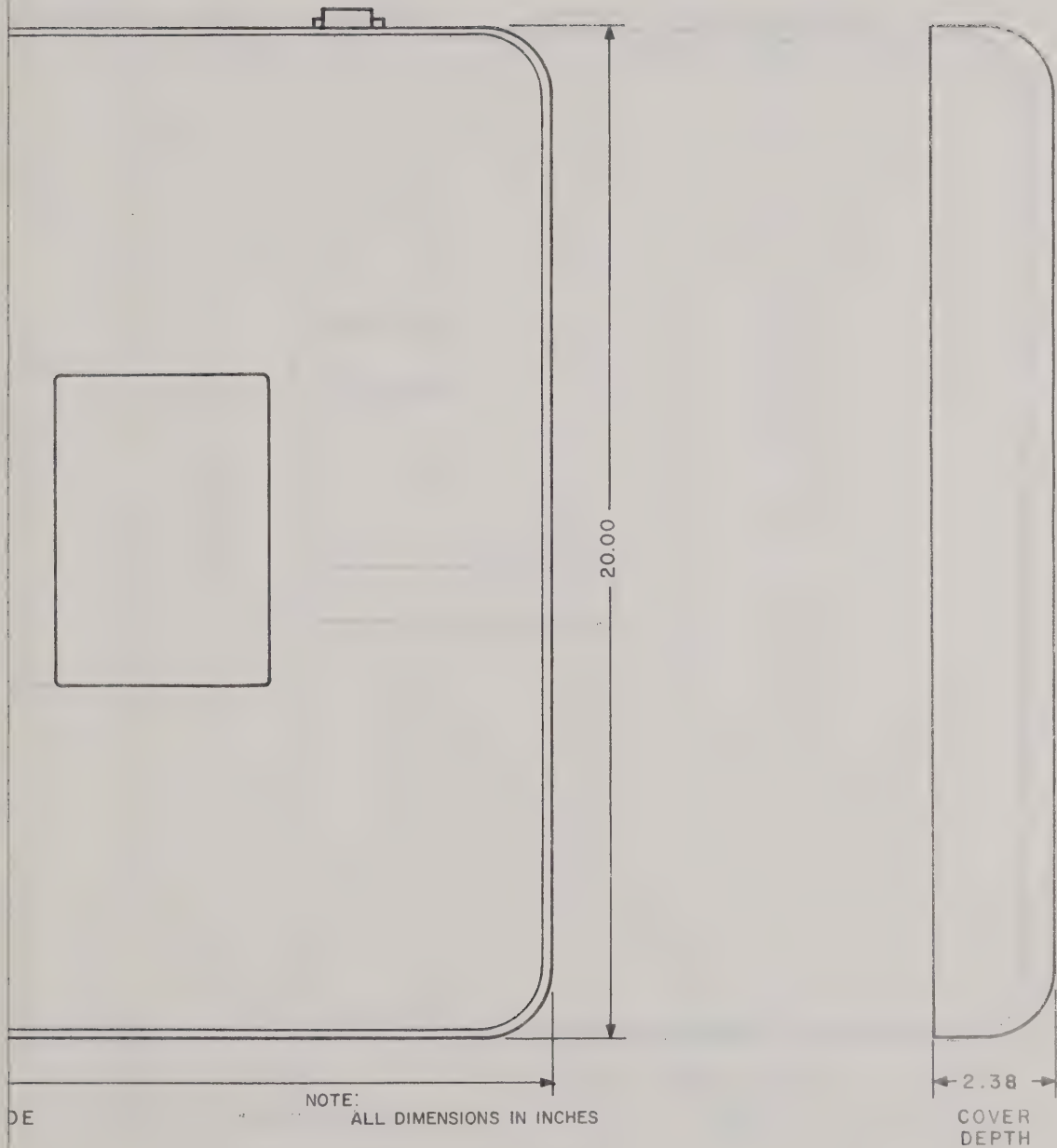


Figure 2-1. Communications Test Kit, MK-1102/TYA-11, Installation Drawing



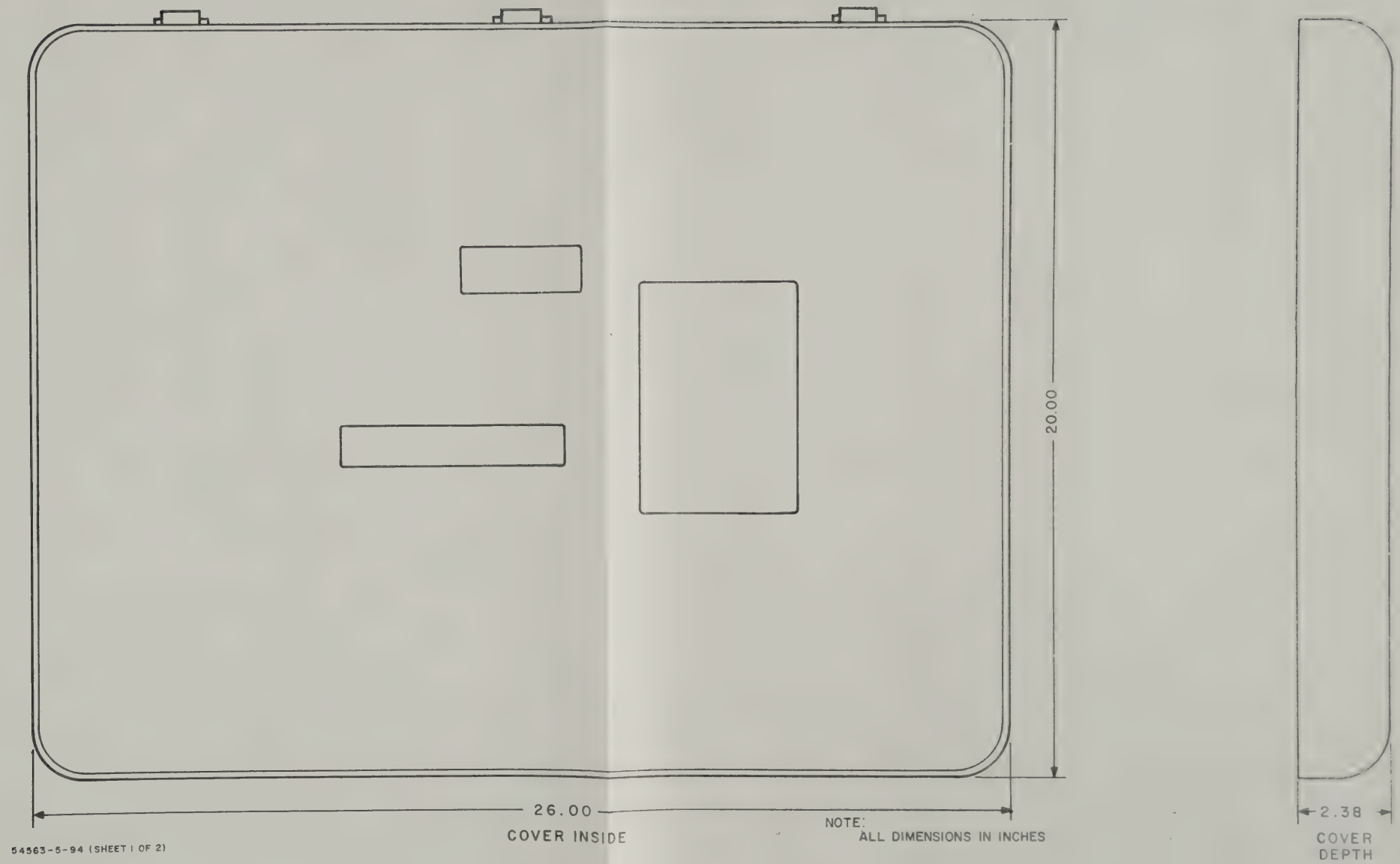
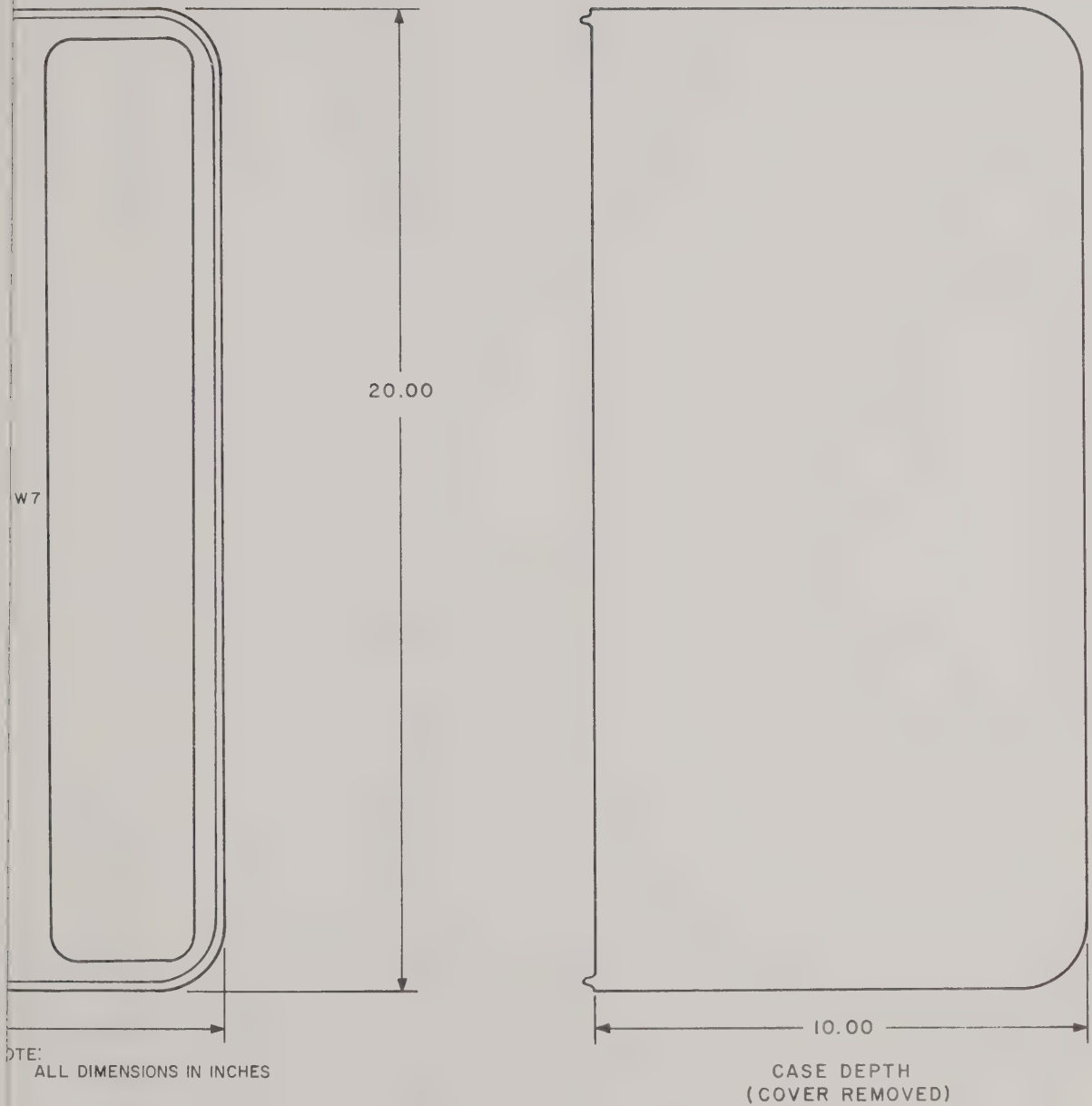


Figure 2-2. Communications Test Kit, MK-1104/TYA-11, Installation Drawing (Sheet 1 of 2)



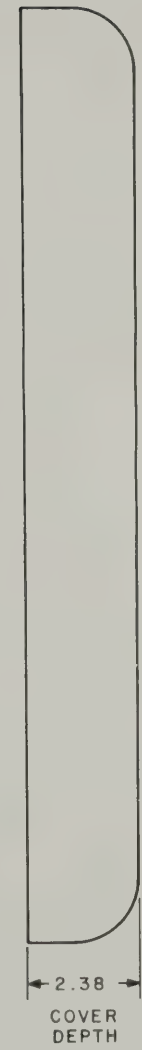
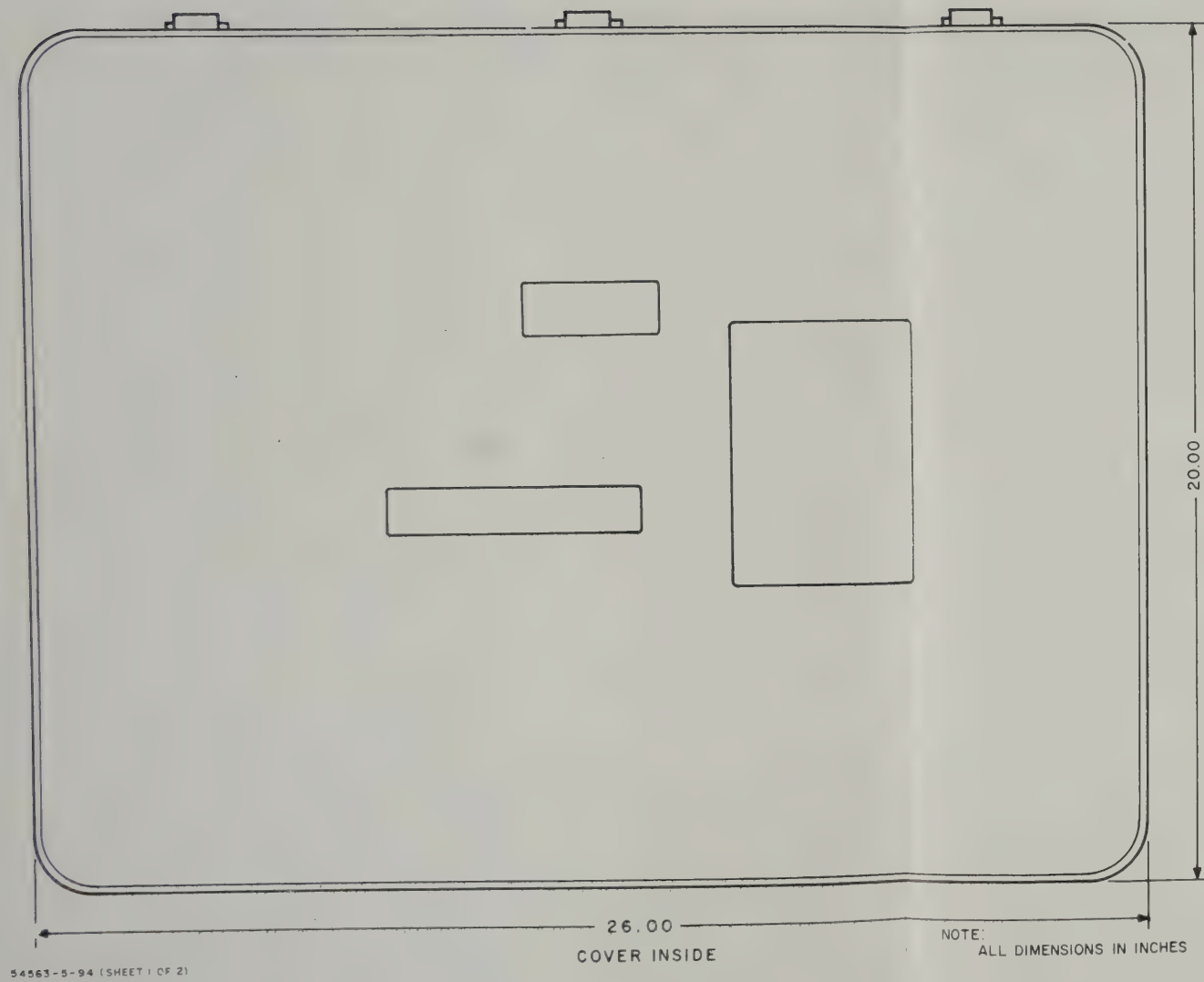


Figure 2-2. Communications Test Kit, MK-1104/TYA-11, Installation Drawing (Sheet 1 of 2)

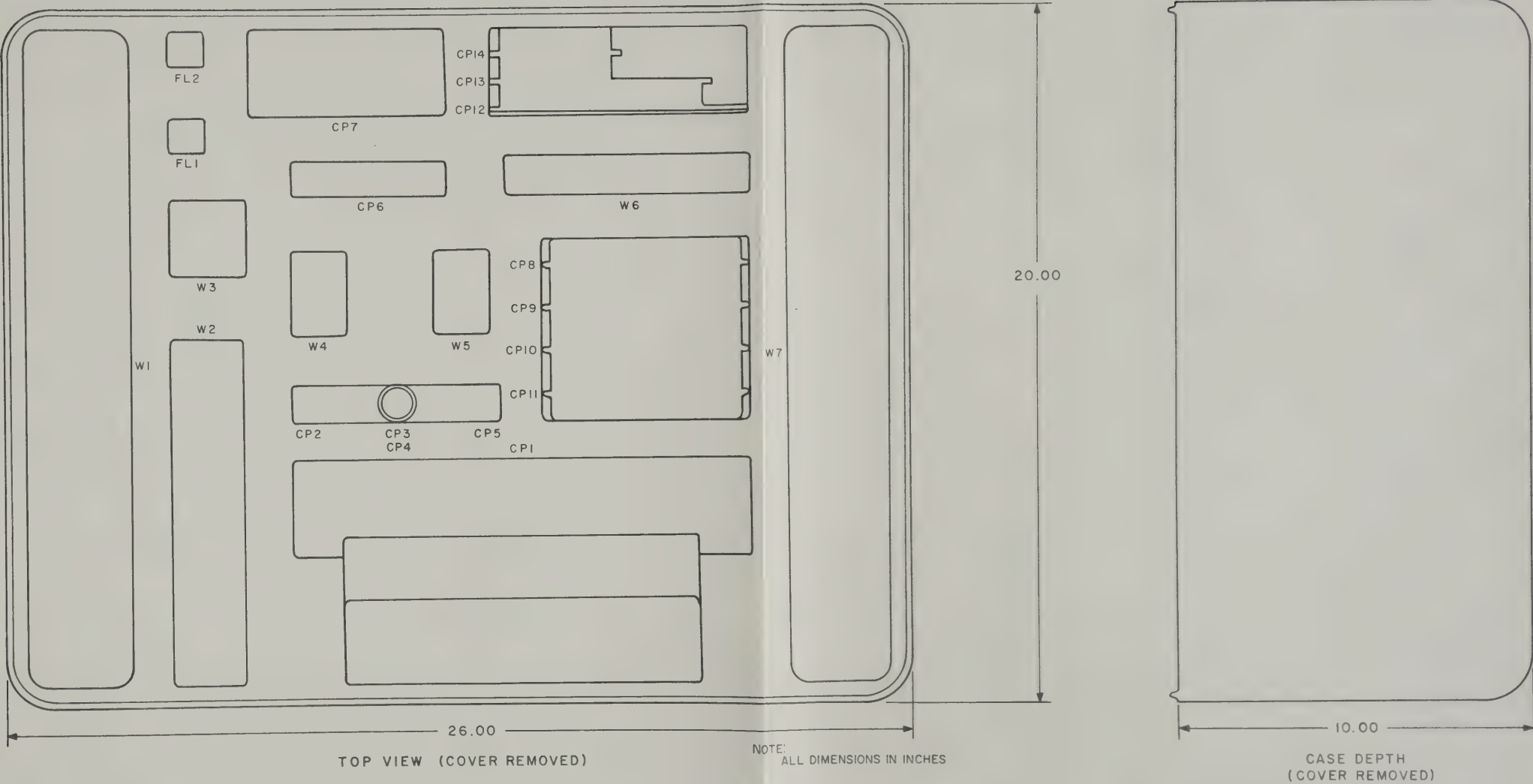


Figure 2-2. Communications Test Kit, MK-1104/TYA-11, Installation Drawing (Sheet 2 of 2)

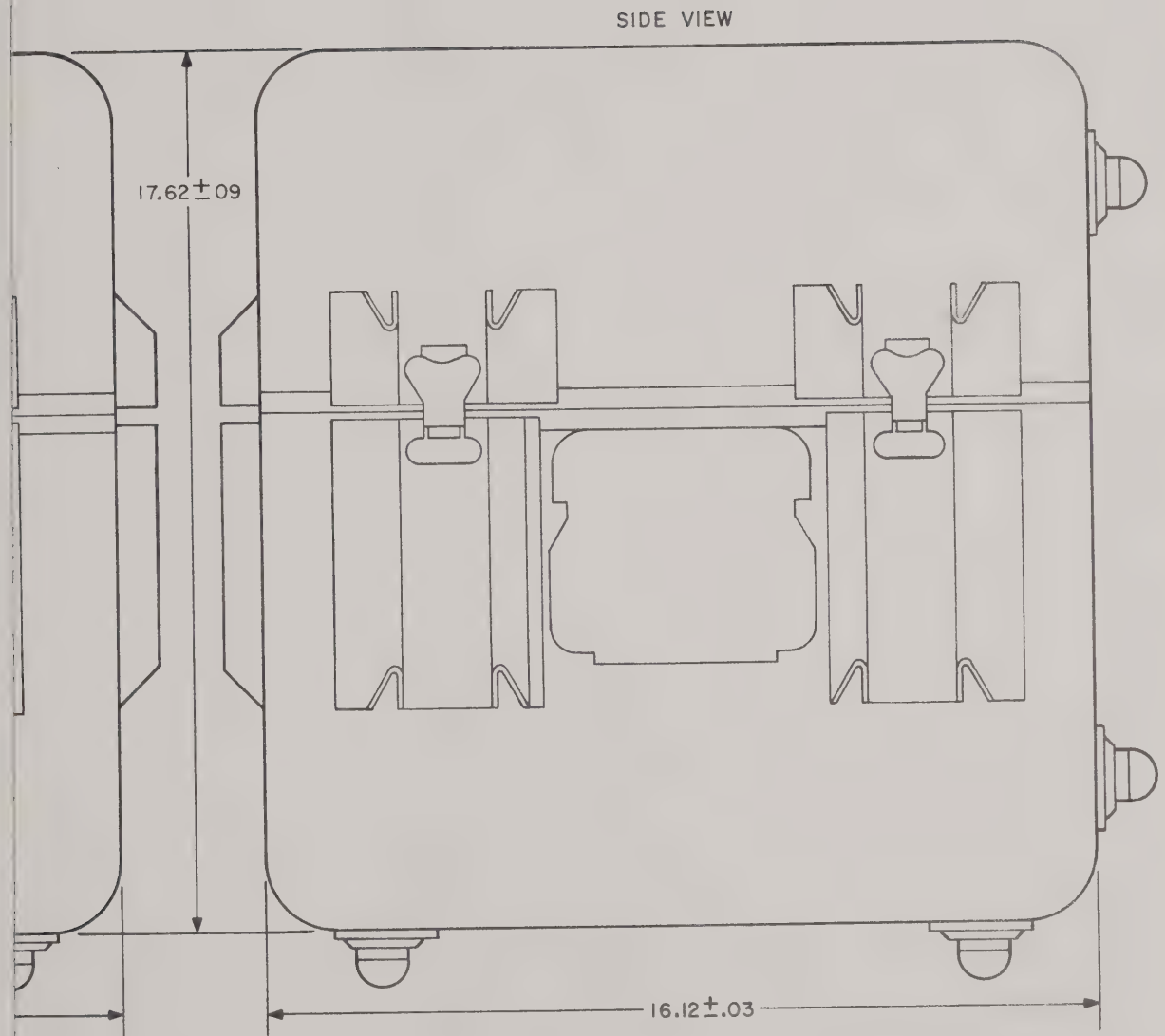


Figure 2-3. Test Set Coupler, MX-8154/TYA-11, Installation Drawing

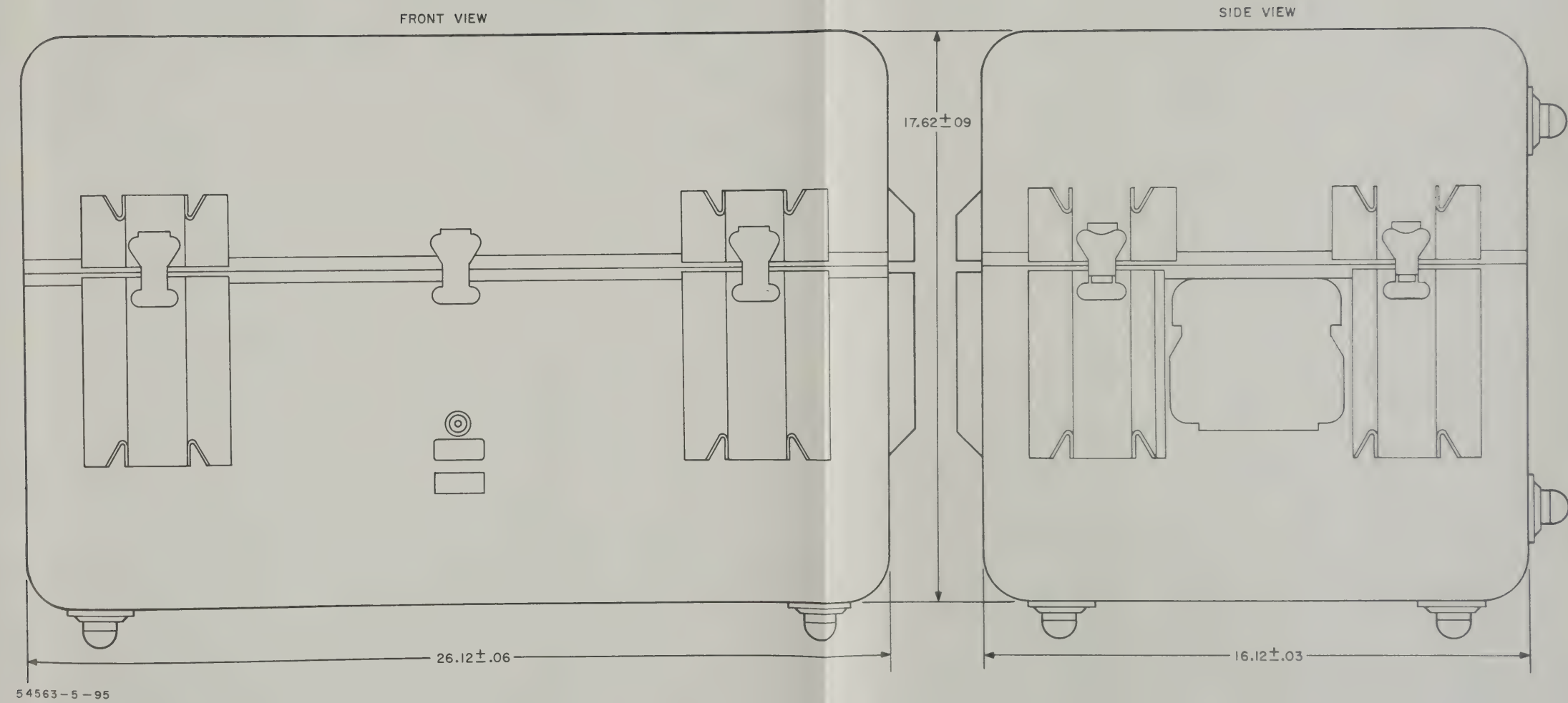


Figure 2-3. Test Set Coupler, MX-8154/TYA-11, Installation Drawing

SECTION 4

TROUBLESHOOTING

4-1. LOGICAL TROUBLESHOOTING. This section presents troubleshooting information for Communications Test Kit, MK-1102/TYA-11, Communications Test Kit, MK-1104/TYA-11, and Test Set Coupler, MX-8154/TYA-11. The contents of this section include: equipment overall functional description and overall block diagrams; overall functional description of each functional section, together with its servicing block diagram, and applicable test data; and detailed functional description, simplified schematic diagram, servicing block diagram information, and applicable test data for individual portions of functional sections. Information contained in NAVSHIPS 0967-000-0130 or NAVSHIPS 0967-000-0120 that is applicable to this chapter is referenced rather than repeated. Overall block diagrams (Figures 4-1 through 4-8) appear where referenced, and all servicing block diagrams (Figures 4-9 through 4-28) appear at the end of the section. The objective of the logical troubleshooting method is to develop the technician's ability to decide what checks should be performed and where to make them. The information presented in the manual should not act as a crutch for the technician, but as a maintenance tool. When adequate historical data is not available, troubleshooting procedures should be based on the following six logical steps.

a. SYMPTOM RECOGNITION. This is the first step in the troubleshooting procedure and is based on a complete knowledge and understanding of the equipment operating characteristics. All equipment troubles are not the direct result of component failure. Therefore, a trouble in the equipment is not always easy to recognize since all conditions of less than peak performance are not always apparent. This type of equipment trouble is usually discovered while accomplishing preventive maintenance procedures. It is important that the less apparent troubles, as well as the apparent troubles, be recognized. Therefore, the technician must be able to recognize when the equipment is malfunctioning or when performance has deteriorated beyond acceptable limits. To perform

this step, the technician will use the following data:

1. Expected performance or design characteristics for the equipment as a whole (refer to Section 1)
2. Performance limits for individual units of the equipment (refer to Section 5)
3. Data regarding other factors which can cause a deterioration in equipment performance but are not the direct result of an equipment malfunction.

b. SYMPTOM ELABORATION. After the equipment trouble has been recognized, all the available aids designed into the equipment further elaborate on the original trouble symptom. Use of front panel controls and other built-in indicating or testing aids to provide better identification of the original trouble symptom. Also, checking or otherwise manipulating the operating controls may eliminate the trouble. As an aid to further define the trouble, the technician requires:

1. A list of all front panel indicating devices (listing normal indications) and the controls which govern their operation (refer to Section 3)
2. A list of all critical adjustments or alignment procedures which affect equipment operation (refer to Section 5).

c. LISTING PROBABLE FAULTY FUNCTION. The next step in logical troubleshooting is to formulate a number of logical choices as to the cause and likely location (functional section) of the trouble. The logical choices are based on knowledge of the equipment operation, a full identification of the trouble symptom, and information contained in this manual; thus limiting the location of the fault to the functional sections which, if defective, could reasonably cause the trouble. When selecting possible faulty functional sections, the technician should refer to the following:

1. The complete functional description of the equipment, the detailed description

of the operation of each functional division of the equipment, and the explanation of critical circuits and reasons for adjustments

2. Block diagrams of the equipment broken down into functional divisions.

d. LOCALIZING THE FAULTY FUNCTION. For the greatest efficiency in localizing trouble, the functional sections which have been selected by the logical choice should be tested in an order, requiring the least time, based on the validity of the logical choice and the difficulties in making the necessary tests. If the tests do not prove that functional section to be at fault, the next selection should be tested, and so on until the faulty functional section is located. As aids in this process, a functional description and a servicing block diagram for each functional section are contained in this manual. Waveforms (or other pertinent indications) are included at significant check points on servicing block diagrams to aid in isolating the faulty section. Also, test data (such as information on controls settings, critical adjustments, and required test equipment) are supplied to augment the functional description and servicing block diagram for each functional section. To perform these tests, the technician should refer to the following:

1. The lists of test equipment and special tools required

2. The servicing block diagram for the functional section of the equipment to be tested

3. Illustrations calling out significant test point locations.

e. LOCALIZING TROUBLE TO THE CIRCUIT. After the faulty functional section has been isolated, additional logical choices of which group of circuits or circuit (within the functional section) is at fault may be required. Servicing block diagrams for each functional section and individual functional circuit groups (when required) provide the signal flow and test location information needed to bracket and then isolate the faulty circuit. Functional descriptions, simplified schematics, and pertinent test data for individual circuits or groups of circuits comprising the functional section are all in Section 4 of this manual. In order to isolate and pinpoint the part(s) causing the trouble, the technician shall use the following:

1. Overall equipment schematic diagram and the individual unit schematic diagram (refer to Section 5)

2. Lists of pertinent measurements (end play, backlash, clearances, temperatures, resistances, waveforms, and so forth) to be used as they apply in checking individual assembly or circuit conditions

3. Illustrations showing the locations of all parts, (refer to Section 5).

f. FAILURE ANALYSIS. After the trouble (faulty component, misalignment, etc.) has been located (but prior to performing corrective action), the procedures followed to this point shall be reviewed to determine exactly why the fault affected the equipment in the manner it did. The review is usually necessary to make certain the fault discovered is actually the cause of the malfunction, and not just the result of the malfunction.

4-2. COMMUNICATIONS TEST KIT, MK-1102/TYA-11. Communications Test Kit, MK-1102/TYA-11 consists of test equipment and associated accessory components listed in Table 1-5 (equipment supplied). This test equipment and accessory components are used in conjunction with the test equipment listed in Table 1-6 (equipment required but not supplied) to troubleshoot and maintain Communications Central Group, AN/TYA-11. The troubleshooting data for Communications Test Kit, MK-1102/TYA-11, consists of functional descriptions for the test equipment listed below:

1. Test Adapter, MX-8151/TYA-11
2. Test Adapter, MX-8150/TYA-11
3. Test Set Coupler, MX-8153/TYA-11
4. Test Adapter, MX-8152/TYA-11
5. Radio Set Control, C-3811/AR.

The troubleshooting data for the accessory components of Communications Test Kit, MK-1102/TYA-11, is not applicable.

a. TEST ADAPTER, MX-8151/TYA-11, FUNCTIONAL DESCRIPTION. The troubleshooting data for Test Adapter, MX-8151/TYA-11 consists of a functional description, followed by test data. The functional description is based on detail signal flow through the test fixture during the testing of Radio Set, AN/GRC-134. The test data provides information necessary to isolate the fault circuit part of the test fixture.

(1) Description. Test Adapter, MX-8151/TYA-11, (see Figure 4-9) extends the remote audio, indicator, and keyline functions from connector J1 of Radio Set, AN/GRC-134, to test jacks on the front panel of the Test Adapter. The test jacks provide terminals for applying audio test signals to Radio Set, AN/GRC-134, measuring the resultant audio outputs, applying keying signals and for checking the circuit paths of remote indicators.

(a) Wide Band Audio Out Function. The wide band audio output signal from the receiver functional section of Radio Set, AN/GRC-134, is applied through P1-E to test jack E-J2. The return path for the audio signal is routed from test jack G-J4 through P1-G.

(b) Wide Band Audio In Function. Test jack W-J15 provides a terminal for applying an audio test signal through P1-W to the transmitter functional section of Radio Set, AN/GRC-134. The return path for the audio signal is routed from test jack G-J4.

(c) Wide Band Key Function. The wide band keyline is activated by applying ground to test jack A-J1. The ground is routed to Radio Set, AN/GRC-134, through P1-A.

(d) +28 Vdc Function. Positive +28 vdc is applied from Radio Set Control, C-6622/GRC-134, through P1-F to test jack F-J3, and is measured with respect to test jack G-J4.

(e) Narrow Band Audio Out Function. The audio output signal from the receiver functional section is applied through P1-H and -J to test jacks H-J5 and J-J6.

(f) Narrow Band Audio In Function. Test jacks X-J16 and Y-J17 provide terminals for applying an audio test signal through P1-X and -Y to the transmitter functional section.

(g) Remote Test Key Function. The remote test keyline is activated by connecting test jack Q-J10 to P-J9, which applies ground from P1-Q to P1-P.

(h) Remote Keyline Function. The remote keyline is activated by connecting test jack M-J8 to L-J7, which applies ground from P1-M to P1-L.

(i) Radio No.5 Voice Indicator Function. When Radio Set, AN/GRC-134, is energized, the radio no.5 voice indicator circuit is completed from test jack R-J11 through P1-R and from P1-S to S-J12.

(j) Remote Test Indicator Function. When KEY CONTROL switch S3 in the control functional section of Radio Set, AN/GRC-134, is in TEST position, the remote test indicator circuit is completed from test jack U-J13 through P1-U and from P1-V to V-J14.

(2) Test Data. If it has been determined that Test Adapter, MX-8151/TYA-11 is defective, visually inspect the wiring and perform continuity tests using Multimeter, AN/PSM-4. See Figure 5-2 for parts location.

b. TEST ADAPTER, MX-8150/TYA-11, OVERALL FUNCTIONAL DESCRIPTION. The overall troubleshooting data for Test Adapter, MX-8150/TYA-11, consists of a functional description. The functional description is based on overall signal flow through the Test Adapter during the testing of Radio Set AN/GRC-112. The Test Adapter (see Figure 4-1) consists of the remote operation functional section, receive antenna coupler functional section, and the transmit antenna coupler functional section. The remote operation functional section extends the remote audio, data, indicator, and keyline functions from connector A7A1J2 of Radio Set, AN/GRC-112, to test jacks J1 through J30 on the Test Adapter front panel. The receive antenna coupler functional section extends the remote frequency tuning servo functions from connector A7A1J3 of Radio Set, AN/GRC-112, to test jacks J31 through J48 on the Test Adapter front panel. The transmit antenna coupler functional section extends the remote frequency tuning servo and wide band audio functions from connector A7A1J4 of Radio Set, AN/GRC-112, to test jacks J49 through J71 on the Test Adapter front panel.

(1) Remote Operation Functional Section. The troubleshooting data for the remote operation functional section (see Figure 4-10) consists of a functional description, followed by test data. The test data is presented in paragraph 4-2b(4).

(a) Preset Channel Binary Code Function. The preset channel binary function is applied to Radio Set, AN/GRC-112, by grounding test jacks A-J1 through D-J4 in accordance with the preset channel binary code.

(b) Narrow Band Audio In Function. Test jacks G-J7 and H-J8 provide terminals for applying an audio test signal through P2-G and -H to the transmitter functional section of Radio Set, AN/GRC-112.

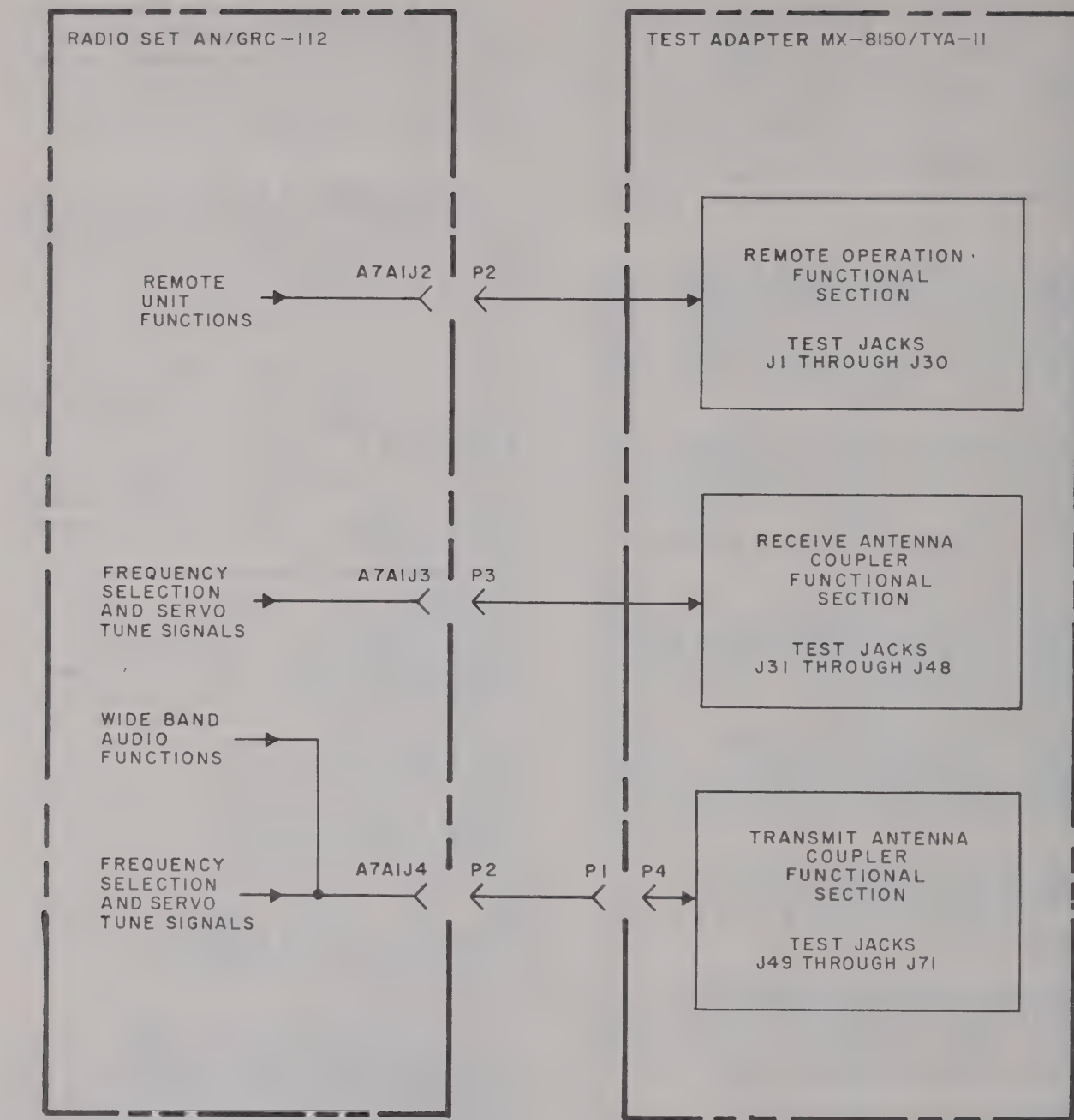


Figure 4-1. Test Adapter, MX-8150/TYA-11, Overall Block Diagram

(c) Narrow Band Audio Out Function. The audio output signal from the receiver functional section of Radio Set, AN/GRC-112, is applied through P2-K and -L to test jacks K-J9 and L-J10.

(d) Keying Ground Function. The remote keyline is activated by connecting test jack N-J11 to P-J12, which applied ground from P2-P to P2-N.

(e) Remote Voice Indicator Function. When CHANNEL MODE switch on Radio Set, AN/GRC-112, is in the REMOTE position, the remote voice indicator circuit is completed from test jack T-J13 through P2-T and from test jack U-J14 through P2-U.

(f) FSK Data In Function. Test jacks V-J15 and W-J16 provide terminals for applying fsk data test signal through P2-V and -W to the

fsk indicator functional section of Radio Set, AN/GRC-112.

(g) FSK Keying Function. Test jacks X-J17 and Z-J18 provide terminals for applying fsk keying test signal through P2-X and -Z to the fsk modulator functional section of Radio Set, AN/GRC-112.

(h) FSK Data Out Function. The fsk data signal from the fsk detector functional section is applied through P2-a and -b to test jacks a-J19 and b-J20.

(i) Remote Test Key Function. The remote test keyline is activated by connecting test jack C-J21 to d-J22, which applied ground from P2-d to P2-C.

(j) Remote Test Indicator Function. When KEY CONTROL switch on Radio Set, AN/GRC-112, is in TEST position, the remote test indicator circuit is completed from test jack e-J23 through P2-e and from test jack f-J24 through P2-f.

(k) Remote Equipment On Indicator Function. When relay A1K1 in the control functional section of Radio Set, AN/GRC-112, is energized, the remote equipment on indicator circuit is completed from test jack G-J25 through P2-g and from H-J26 through P2-h.

(l) Out of Service Indicator Function. When MODULATION MODE switch on Radio Set, AN/GRC-112, is in VOICE position the out of service indicator circuit is completed from test jack j-J27 through P2-j and from test jack K-J28 through P2-k.

(m) Data Indicator Function. When MODULATION MODE switch on Radio Set, AN/GRC-112, is in DATA position, the data indicator circuit is completed from test jack m-J29 through P2-m and from test jack n-J30 through P2-n.

(2) Receive Antenna Coupler Functional Section. The troubleshooting data for the receive antenna coupler functional section (see Figure 4-11) consists of a functional description. The test data is presented in paragraph 4-2b(4).

(a) Tens, Units, and Tenths Voltage Functions. The tens, units, and tenths voltage functions are applied from the receiver frequency select circuits of Radio Set, AN/GRC-112, to test jacks A-J31, C-J32 and E-J33, respectively.

(b) Adder Return and Tap 11 Functions. The adder return and tap 11 functions are applied from the receiver frequency tuning servo functional section to test jacks G-J34 and J-J35, respectively.

(c) Servo Command Ground Function. The servo command ground function is applied from the receiver frequency selection functional section to test jack L-J36.

(d) Tap 13 Servo Command Voltage Function. The tap 13 servo command voltage function is applied from the receiver frequency tuning circuits to test jack M-37.

(e) Tap Function. The tap function is applied from the receiver frequency tuning servo circuits to test jack N-J38.

(f) Hundreds Ground Function. The hundreds ground function is applied from the receiver frequency selection circuits to test jack S-J39.

(g) +28 VDC Servo Tune Gate Function. Test jack T-J40 provides a terminal for applying the +28 vdc servo tune gate signal to Radio Set, AN/GRC-112.

(h) Hundredths Voltage Function. The hundredths voltage function is applied from the receiver frequency selection circuits to test jack U-J41.

(i) High Track and Low Track Functions. The high track and low track functions are applied from the receiver frequency tuning servo circuits to test jacks V-J42 and X-J43, respectively.

(j) 115 VAC Neutral and 115 VAC Phase B Functions. The 115 vac neutral and 115 vac phase B power is applied from the ac power distribution circuits of Radio Set, AN/GRC-112, to test jacks Z-J44 and a-J45, respectively.

(k) +28 VDC and Ground Functions. Positive 28 vdc power is applied from Radio Set, AN/GRC-112, to test jacks d-J47 and R-J48. Test jack b-J46 receives Radio Set, AN/GRC-112, chassis ground.

(3) Transmit Antenna Coupler Functional Section. The troubleshooting data for the transmit antenna coupler functional section (see Figure 4-12) consists of a functional description. The test data are presented in paragraph 4-2b(4).

(a) Tens, Units, and Tenths Voltage Functions. The tens, units, and tenths voltage functions are applied from the transmitter frequency select circuits of Radio Set, AN/GRC-112, to test jacks A-J49, C-J50, and E-J51, respectively.

(b) Adder Return and Tap 11 Functions. The adder return and tap 11 functions are applied from the transmitter frequency tuning servo functional section to test jacks G-J52 and J-J53.

(c) Servo Command Ground Function. The servo command ground function is applied from the transmitter frequency selection functional section to test jack e-J54.

(d) Tap 13 Servo Command Voltage Function. The tap 13 servo command voltage function is applied from the transmitter frequency tuning circuits to test jack p-J55.

(e) Tap Function. The tap function is applied from the receiver frequency tuning servo circuits to test jack R-J56.

(f) Hundreds, Ground Function. The hundreds ground function is applied from the transmitter frequency selection circuits to test jack S-J57.

(g) +28 VDC Servo Tune Gate Function. Test jack L-J58 provides a terminal for applying the +28 vdc servo tune gate signal to Radio Set, AN/GRC-112.

(h) Hundredths Voltage Function. The hundredths voltage function is applied from the transmitter frequency selection circuits to test jack M-J59.

(i) High Track and Low Track Functions. The high track and low track functions are applied from the transmitter frequency tuning servo circuits to test jacks N-J60 and T-J61, respectively.

(j) 115 VAC Power. The 115 vac neutral, 115 vac phase A, and 115 vac phase B power is applied from the ac power distribution circuits of Radio Set, AN/GRC-112, to test jacks b-J62, c-J63, and d-J64, respectively.

(k) +28 VDC and Ground Functions. Positive 28 vdc is applied from Radio Set, AN/GRC-112, to test jack W-J66. Test jacks X-J65 and j-J68 receive Radio Set, AN/GRC-112, chassis ground.

(l) Servo Position Gate Function. Test jack h-J67 provides a terminal for applying the servo position gate signal to Radio Set, AN/GRC-112.

(m) Wide Band Audio In Function. Test jack g-J69 provides a terminal for applying an audio test signal through A7A4J-g to the transmitter functional section of Radio Set, AN/GRC-112.

(n) Wide Band Audio Out Function. The wide band audio signal from the receiver functional section of Radio Set, AN/GRC-112, is applied to test jack s-J70.

(o) Wide Band Select Function. Test jack r-J71 provides a terminal for applying ground to the coils of the wide band select relays in the transmitter and receiver functional sections of Radio Set, AN/GRC-112.

(4) Test Data. If it has been determined that the remote operation, receive antenna coupler, or the transmit antenna coupler functional sections are defective, visually inspect the wiring and perform continuity tests using Multimeter, AN/PSM-4. See Figure 5-1 for parts location.

c. TEST SET COUPLER, MX-8153/TYA-11, OVERALL FUNCTIONAL DESCRIPTION. The overall troubleshooting data for Test Set Coupler, MX-8153/TYA-11, consists of a functional description. The functional description is based on major signal flow through the Test Set Coupler during the testing of Synthesizer-Receiver, ECI 01-00510-001, 01-00510-002, and 01-00510-003. Test Set Coupler, MX-8153/TYA-11 (see Figure 4-2) consists of the power supply functional section, monitoring functional section, and frequency tuning servo functional section. The power supply functional section receives 115 vac from a two-phase, 400 cps power source and supplies ac and dc power to Synthesizer-Receiver under test and to Radio Set Control, C-3811/AR. The monitoring functional section applies an external antenna input signal to Synthesizer-Receiver and provides loads and test points for the Synthesizer-Receiver output signals. The frequency tuning servo functional section provides interconnections for the frequency tuning servo signals which are generated in Radio Set Control, C-3811/AR, and applied to Synthesizer-Receiver.

(1) Power Supply Functional Section. The troubleshooting data for the power supply functional section consists of a functional description, followed by test data. The functional description is based on major signal flow through the functional section and describes the operation of each circuit group with respect to the overall function of the power supply functional section. The test data provides the information necessary to isolate the faulty circuit group or detail part of the power supply functional section.

(a) Description. The power supply functional section (see Figure 4-13) contains a +28 vdc regulated power supply and a -18 vdc regulated power supply. The filter and rectifier circuits of the -18 vdc power supply are located on subassembly A2; the filter and regulator circuits of the +28 vdc power supply are located on subassembly A1. The power supply functional section receives 115 vac power through connector P1-A, -B and -D. Phase B power

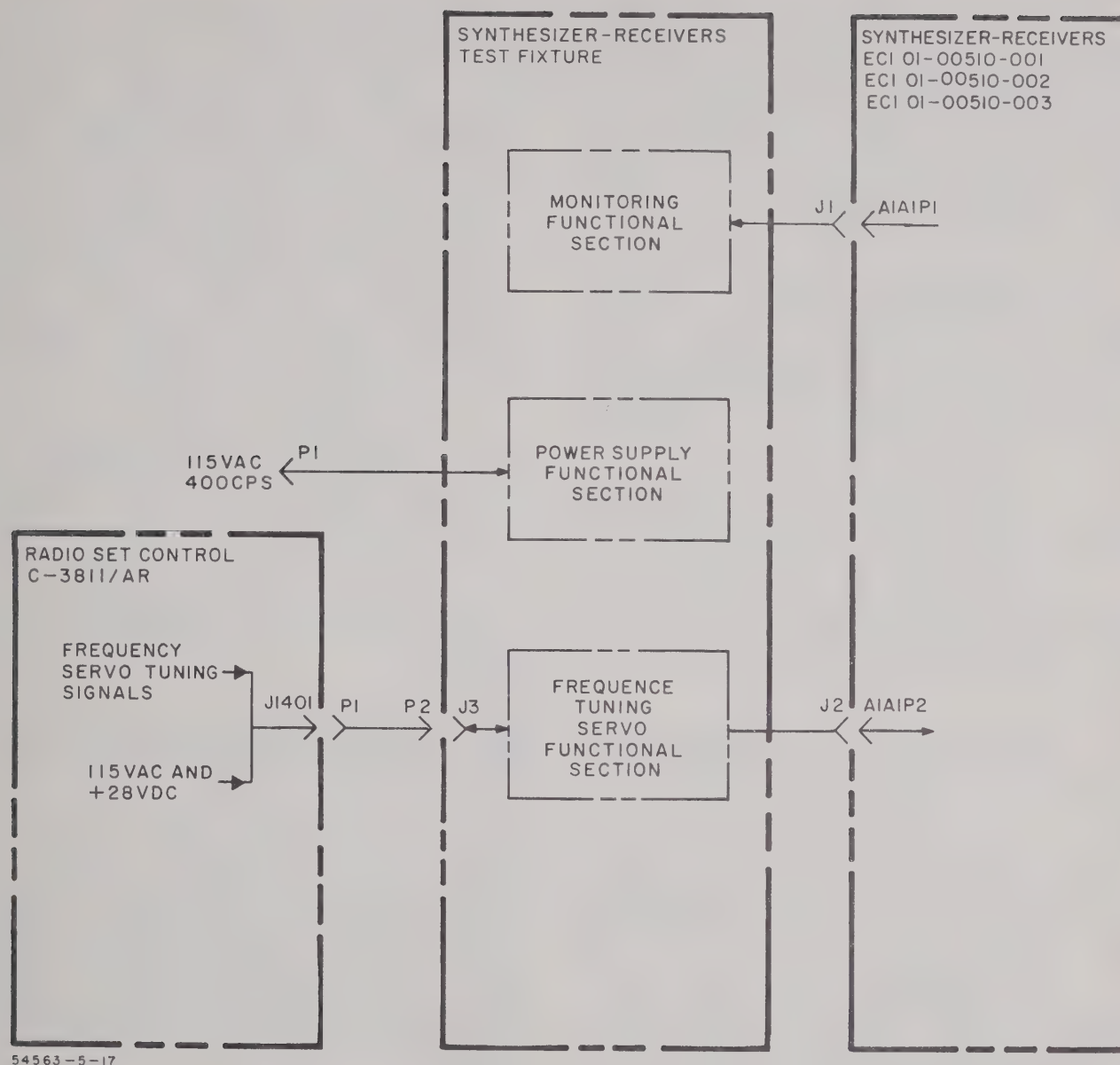


Figure 4-2. Test Set Coupler, MX-8153/TYA-11, Overall Block Diagram

is applied through circuit breaker CB2 to AC indicator DS1 and to the frequency tuning servo functional section. Phase A power is applied through circuit breaker CB2 to transformer T1. Transformer T1 produces step-down voltages for the +28 vdc and -18 vdc power supplies. The step-down voltage at terminals T1-3 and T1-4 is applied to bridge rectifier circuit CR1 of the +28 vdc power supply and is rectified. The unfiltered +28 volts is applied through circuit breaker CB1 to filter A1C1 and A1C2 and to regulator A1. The regulated +28 vdc power is applied to DC indicator DS2, test jack J35, and through connector J1-3 to the

voltage regulator circuit group in Synthesizer-Receivers. The +28 vdc power is routed from the voltage regulator through J1-6 into the frequency tuning servo functional section. The voltage regulator also drops the +28 volts to +18 volts, which is returned to the frequency servo tune functional section through J1-2. The step-down voltage at terminals T1-5 and T1-6 is applied to bridge rectifier circuit A2CR1 through A2CR4 of the 18-volt power supply. The rectified voltage is filtered by filter A2C2 and maintained at a constant level by breakdown diode CR2. The 18-vdc power is applied to test point J36 and to the frequency tuning servo

functional section. The negative output of the +28 volt power supply and the positive output of the -18 volt power supply form a common dc return which is applied to test point J37 and to the frequency tuning servo functional section. Potentiometer A2R1 which is connected between the two bridge rectifiers provides an adjustable, 400 cps, servo tune signal. The servo tune signal is applied to the frequency tuning servo functional section.

(b) Test Data. If it has been determined that the power supply is defective, trace the signal path through the power supply circuits. To isolate the trouble to a circuit group or detail part of the power supply, perform the steps of the procedure in Table 4-1. See Figure 4-13 for test points and Figure 5-6 for parts location.

1 Test Equipment. Test equipment required for performing the trouble isolation consists of Electronic Multimeter, AN/USM-116.

2 Test Setup. Set circuit breakers CB1 and CB2 to the off position and connect Test Set Coupler, MX-8153/TYA-11, through connector P1 to 115/208 vac, 400 cps, two phase power source.

3 Trouble Isolation. To isolate the faulty circuit group or detail part of the power supply, perform the procedural steps of Table 4-1 in sequence. After performing the preliminary action, compare the indication obtained with the expected results listed in the NORMAL INDICATION column. If the indication is abnormal, follow the procedure outlined in the IF INDICATION IS ABNORMAL column.

4 Adjustments and Alignments. The adjustment controls, located in the power supply functional section, consist of screwdriver-adjustable potentiometers A2R1 and A1R8. Potentiometer A2R1 is adjusted to 1 ± 0.5 vac with respect to ground. Potentiometer A1R8 is adjusted for a +28 vdc output of the +28 vdc regulator. Refer to Section 5 for the adjustment procedures.

(c) +28 Volt Voltage Regulator Circuit Group. As a further aid in the description of the +28 volt regulator circuit group, the circuit group is discussed in order of signal flow.

1 Circuit (Stage) Description. Series regulator Q2 (see Figure 4-3) provides a variable resistance across the collector-emitter junction which is placed in series in the positive leg of the +28 volt regulator circuit. A control signal, applied to the base of Q2, produces a change in the voltage drop across the junction which

compensates for the variations in the output voltage of the regulator circuit. Comparator A1Q3 samples the output voltage across A1R8 and compares this sample with a reference voltage. The reference voltage is supplied by reference diodes A1CR1 and A1CR2, amplified by reference diodes A1CR1 and A1CR2, amplified by reference amplifier A1Q2, and applied to the emitter of comparator A1Q3. The difference between the sample voltage and the reference voltage is applied as a control signal from the collector of A1Q3 to the base of control amplifier A1Q1. The signal is amplified and applied to the base of regulator driver Q1 which is connected to series regulator Q2.

2 Test Data. If it has been determined that the +28 vdc regulator circuit group is defective, isolate the defective stage by performing voltage measurements at test points shown in Figure 4-3. See Figure 5-4 for parts location.

a Test Equipment Required. Test equipment required for performing the trouble isolation consists of Electronic Multimeter, AN/USM-116.

b Test Setup. If necessary, remove four screws securing the regulator assembly, to provide access to the test points.

(2) Monitoring Functional Section. The troubleshooting data for the monitoring functional section consists of a functional description, followed by test data. The functional description is based on major signal flow through the functional section, and describes the operation of each circuit group with respect to the overall function of the monitoring functional section. The test data provide the information necessary to isolate the faulty circuit of the monitoring functional section.

(a) Description. The monitoring functional section (see Figure 4-14) extends nine signal functions from the Synthesizer-Receivers to test jacks on the front panel of Test Set Coupler, MX-8153/TYA-11. It also provides a jack for injecting the antenna signal to the Synthesizer-Receivers.

1 AGC Function. The AGC signal from the receiver rf amplifier and the am. detector circuit groups is applied through J2-20 to test jack J23.

2 High Track Function. The high track signal from the frequency select circuit group is applied through J1-14 to test jack J25.

TABLE 4-1. TEST SET COUPLER, MX-8153/TYA-11, POWER SUPPLY, TROUBLE ISOLATION

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION	IF INDICATION IS ABNORMAL
1	Set circuit breaker CB1 to ON.		AC indicator DS1 lights.	Refer to paragraph 4-2a and check the primary power distribution.
2	Set circuit breaker CB2 to ON.		DC indicator DS2 lights.	Proceed to step 3. If indication is normal, proceed to step 5.
3	Connect Electronic Multimeter, AN/USM-116, across transformer T1 terminals 3 and 4, test point A1, to measure 35 vac.	(A1)	Electronic Multimeter indicates 35 vac.	Check continuity of transformer T1 primary and secondary windings. If indication is normal, proceed to step 4.
4	Connect electronic multimeter between J37 test point A2 and CB1-2 test point A3 to measure +28 vdc.	(A2) and (A3)	Electronic multimeter indicates +28 vdc.	Check rectifier CR1 and the continuity of CB1. If indication is normal, check filter A1C1, A1C2 and the 28-volt regulator.
5	Connect Electronic Multimeter, AN/USM-116 between J37 test point A2 and J36 test point A4 to measure -18 vdc.	(A2) and (A4)	AN/USM-116 indicates -18 vdc.	Proceed to step 6.
6	Connect Electronic Multimeter, AN/USM-116 across transformer T1 terminals 5 and 6, test point A5, to measure 23 vac.	(A5)	AN/USM-116 indicates 23 vac.	Check continuity of transformer T1 secondary winding. If indication is normal, check rectifiers A2CR1 thru A2CR4, filter A2C2, and diode CR2.

3 Low Track Function. The low track signal from the frequency select circuit group is applied through J1-23 to test jack J26.

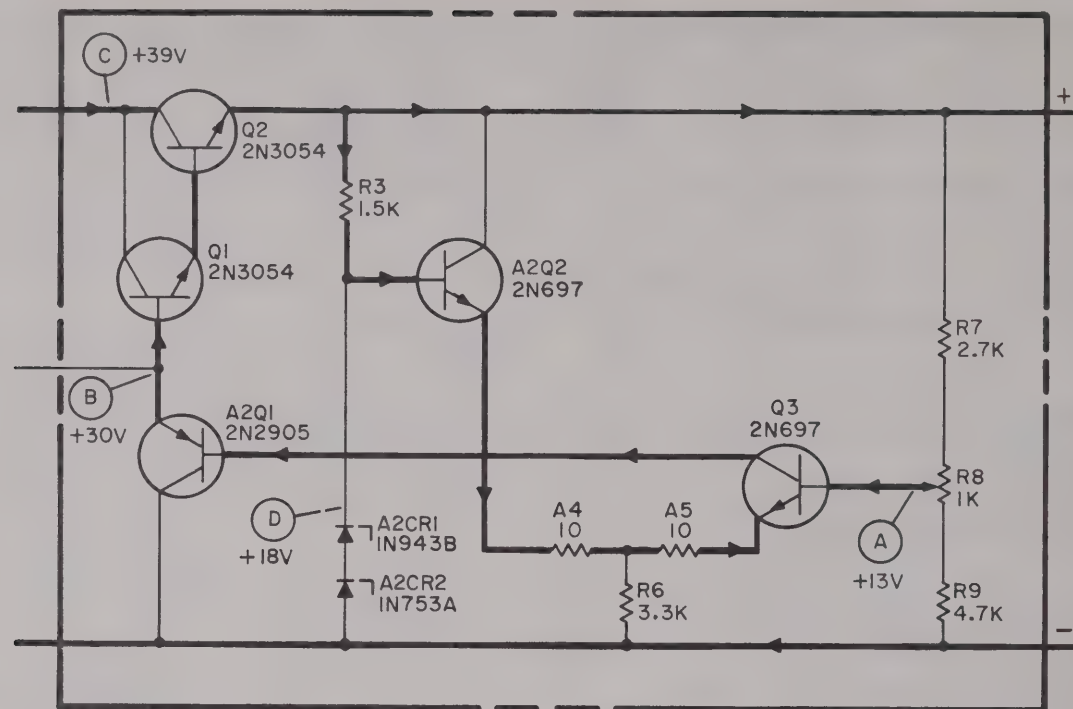
4 Tap Function. The tap function from the servoamplifier circuit group is applied through J1-23 to test jack J27.

5 Low Level Audio Function. The low level audio signal from the am. detector circuit group is applied through J1-29 to test jack J32.

6 Audio Function. The audio signal from the am. detector circuit group is applied through J1-17 and J1-19 to load resistor R4 and to test jack J34.

7 Data Function. The data signal from the fsk circuit group is applied through J1-12 and J1-10 to load resistor R5 and to test jack J28.

8 Antenna Function. A 225 to 399 megacycle signal is applied from an external signal generator to jack J38 and through J1-A1 to the rf amplifier circuit group.



54563-5-19

Figure 4-3. +28 Volt Regulator Circuit Group, Simplified Schematic Diagram

9 VFO Function. A 46.25 to 89.9875 vfo signal from the variable frequency oscillator circuit group is applied through J1-A2 to test jack J39.

(b) Test Data. If it has been determined that the monitoring circuits are defective, visually inspect the wiring and perform continuity and resistance tests using Multimeter, AN/PSM-4. See Figure 5-6 for parts location.

(3) Frequency Tuning Servo Functional Section. The troubleshooting data for the frequency tuning servo functional section consists of a functional description followed by test data. The functional description is based on major signal flow through the functional section and describes the operation of each circuit group with respect to the overall function of the frequency tuning servo functional section. The test data provide information necessary to isolate the faulty circuit group or detail part of the frequency tuning functional section.

(a) Description. The frequency tuning servo functional section (see Figure 4-15, sheets 1 and 2) applies the frequency tuning servo signals from Radio Set Control, C-3811/AR, to Synthesizer-Receiver, O-1282(V)/GRC (ECI 01-00510-001, ECI 01-00510-002, or ECI 01-00510-003), distributes ac and dc power to Radio Set Control,

C-3811/AR, and to the Synthesizer-Receiver, and provides control, indications, and test points required for the operation and testing of the Synthesizer-Receiver.

1 Ac Power Distribution. Phase B ac power from the power supply functional section is applied to the Synthesizer-Receiver through J1-27. It returns to Test Set Coupler, MX-8153/TYA-11 through J2-7 and is applied to test jack J30 and through J3-28 to Radio Set Control, C-3811/AR. Phase B power is reapplied through J2-7 to the Synthesizer-Receiver. The ac neutral line is applied as a chassis ground to the Synthesizer-Receiver through J1-26, J2-1, and J2-8, and to Radio Set Control, C-3811/AR, through J3-19 and J3-32.

2 Dc Power Distribution. Negative 18 vdc is applied to the Synthesizer-Receiver through J1-4. Positive 18 vdc is applied from J1-2 through RCVR MUTE switch S3 to test jack J20, and through J2-51 and J2-44 to the receiver mute and receiver protect circuits in the Synthesizer-Receiver. Positive 28 vdc is applied to the Synthesizer-Receiver through J2-23 and J2-18, and to Radio Set Control, C-3811/AR, through J3-37 and J3-14. The dc return from the power supply functional section is applied through J3-18 to chassis ground of Radio Set Control, C-3811/AR. It is also applied to one side of SQUELCH DISABLE switch

S1, SERVO TUNE indicator DS3, SERVO COMMAND indicator DS4, and to TENTHS SERVO COMMAND switch S2.

3 Servo Tune Signal. The servo tune signal is applied from the power supply functional section through RCVR MUTE switch S3 to test jack J21 and through J2-46 to the Synthesizer-Receiver.

4 Hundreds Relay Ground Function. Ground return is applied from Radio Set Control, C-3811/AR, through J3-13 to test jack J16 and through J2-22 to the hundreds relay in the Synthesizer-Receiver.

5 Voice-Data Relay Ground Function. Ground return is applied from Radio Set Control, C-3811/AR, through J3-17 to test jack J22 and through J2-19 to the voice-data relay in the Synthesizer-Receiver.

6 Squelch Disable Function. When SQUELCH DISABLE switch S1 is closed, ground is applied through J2-57 to the Synthesizer-Receiver.

7 Servo Tune Gate and Servo Command Gate Functions. The servo tune gate signal is applied through J2-50 to the SERVO TUNE indicator DS3. The servo command gate signal is applied from J2-49 to the SERVO COMMAND indicator DS4.

8 Tenths Servo Command Function. When the TENTHS SERVO COMMAND switch S2 is closed, ground is applied through J2-42 to the Synthesizer-Receiver.

9 Adder Return, Tap 11, and Tap 12 Functions. The adder return function is applied from Radio Set Control, C-3811/AR, through J3-29 to test jack J15 and through J2-17 to the Synthesizer-Receiver. The tap 11 function is applied from Radio Set Control, C-3811/AR, through J3-30 to test jack J18 and through J2-25 to the Synthesizer-Receiver. The tap 12 function is applied from Radio Set Control, C-3811/AR, through J3-31 to test jack J19 and through J2-27 to the Synthesizer-Receiver.

10 Tens, Units, and Tenths Functions. These functions are applied as +28 vdc levels from the frequency select circuits of Radio Set Control, C-3811/AR, to the servoamplifier circuits of the Synthesizer-Receiver. The functions may be monitored at test jacks J12, J13, and J14.

11 Hundredths Digit Function. The hundredths digit function is applied from the frequency select circuits of Radio Set Control, C-3811/AR, through J3-36 to test jack J17, and through J2-11 to Synthesizer-Receiver.

12 Even Units Ground. The even units ground function is applied from the frequency select circuits of Radio Set Control, C-3811/AR, through J3-15, test jack J24, and through J2-28 to even relay K1 in rf oscillator circuit group.

(b) Test Data. If it has been determined that the frequency tuning servo circuits are defective, visually inspect the wiring and perform continuity tests using Multimeter, AN/PSM-4. See Figure 5-6 for parts location.

d. TEST ADAPTER, MX-8152/TYA-11, OVERALL FUNCTIONAL DESCRIPTION. The overall troubleshooting data for Test Adapter, MX-8152/TYA-11, consists of a functional description. The functional description is based on major signal flow through the Test Adapter during the testing of Antenna Coupler, CU-1406/CU-1406/GRC, and describes the operation of each functional section. The Test Adapter (see Figure 4-4) consists of the power supply functional section, remote low power indicator functional section, and the frequency tuning servo functional section. The power supply functional section receives 115 vac from a two-phase, 400 cps power source and supplies ac and dc power to Antenna Coupler, CU-1406/GRC, under test and to Radio Set Control, C-3811/AR. The remote low power indicator functional section provides test jacks for testing the remote low power indicator circuits of Antenna Coupler, CU-1406/GRC. The frequency tuning servo functional section interconnects Radio Set Control, C-3811/AR, and Antenna Coupler, CU-1406/GRC, and provides test jacks for testing the frequency tuning servo functions.

(1) Power Supply Functional Section. The troubleshooting data for the power supply functional section consists of a functional description, followed by test data. The functional description is based on major signal flow through the functional section and describes the operation of each circuit group with respect to the overall function of the power supply functional section. The test data provide the information necessary to isolate the faulty circuit group or detail part of the power supply functional section.

(a) Description. The power supply functional section (see Figure 4-16) contains a +28 vdc regulated power supply. The filter and the

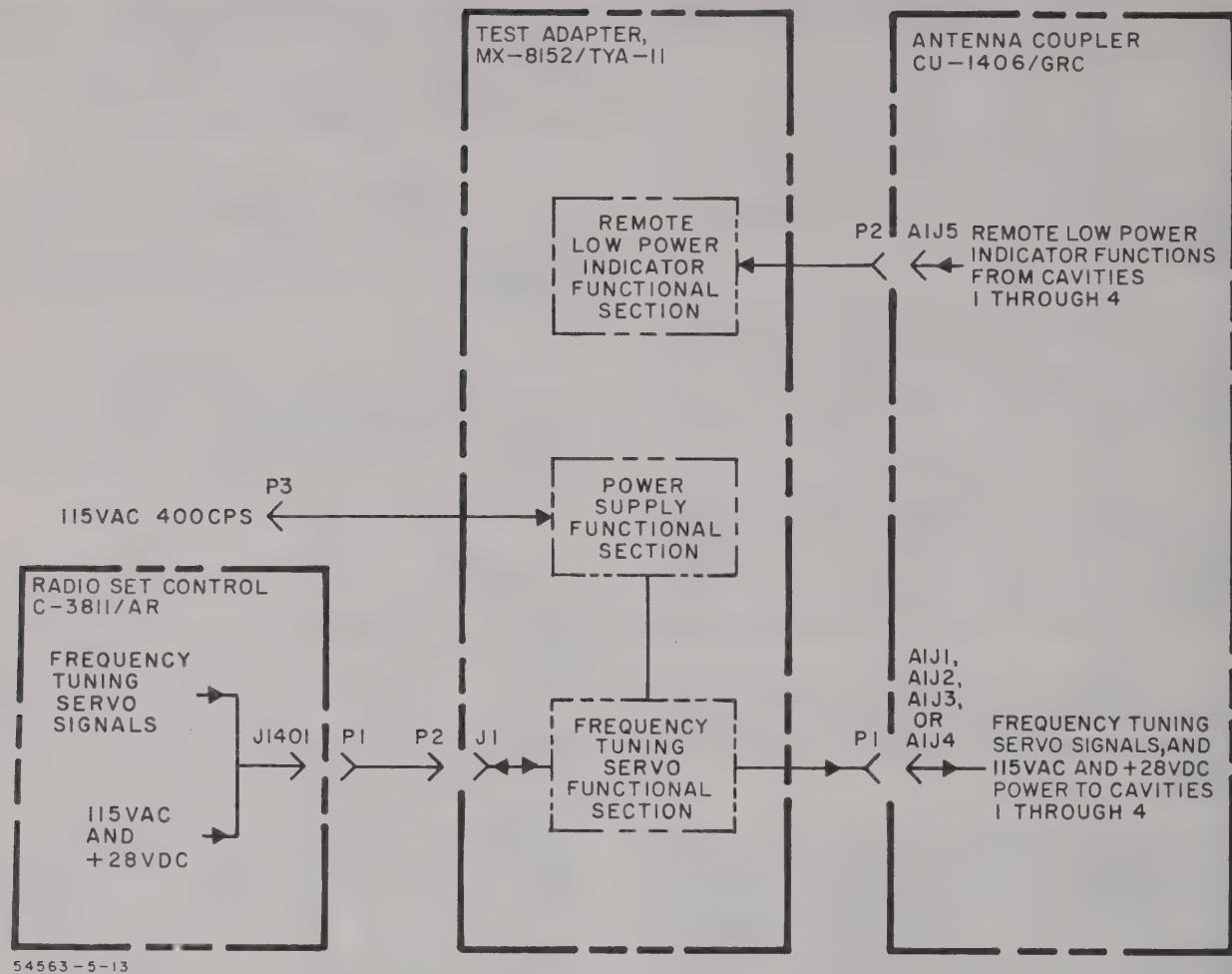


Figure 4-4. Test Adapter, MX-8152/TYA-11, Overall Block Diagram

regulator circuits are located on subassembly A1. The power supply functional section receives 115 vac power through connector P3-A, -B, and -D. Phase B power is applied through circuit breaker CB1 to the frequency tuning servo functional section. Phase A power is applied through circuit breaker CB1 to AC indicator DS1 and to transformer T1. The step-down voltage from transformer T1 secondary is applied to bridge rectifier CR1. The rectified +28-volt power is applied through circuit breaker CB2 to filter C1, C2, and to the +28 vdc voltage regulator. The regulated +28 vdc power is applied to DC indicator DS2, test jack J25, to the frequency tuning servo functional section, and to the remote low power indicator functional section.

(b) Test Data. If it has been determined that the power supply is defective, trace the signal path through the power supply circuits. To isolate the trouble to a circuit group or detail part of the power supply, perform the

steps of the procedure in Table 4-2. See Figure 4-16 for test points and Figure 5-3 for parts location.

1 Test Equipment. Test equipment required for performing the trouble isolation consists of Electronic Multimeter, AN/USM-116.

2 Test Setup. Set circuit breakers CB1 and CB2 to the off position and connect Test Adapter, MX-8153/TYA-11, through connector P3 to a 115/208 vac, 400 cps, three phase power source.

3 Trouble Isolation. To isolate the faulty circuit group or detail part of the power supply, perform the procedural steps of Table 4-2 in sequence. After performing the preliminary action, compare the indication obtained with the expected results listed in the NORMAL INDICATION column. If the indication is abnormal, follow the procedure outlined in the IF INDICATION IS ABNORMAL column.

TABLE 4-2. TEST ADAPTER, MX-8152/TYA-11, TROUBLE ISOLATION

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION	IF INDICATION IS ABNORMAL
1	Set circuit breaker CB1 to ON.		AC indicator DS1 lights.	Refer to paragraph 4-3a and check the primary power distribution.
2	Connect Electronic Multimeter, AN/USM-116, between J26 test point A1 and J25 test point A2. Set circuit breaker CB2 to ON.	(A1) and (A2)	DC indicator lights and electronic multimeter indicates +28 vdc.	Proceed to step 3.
3	Connect electronic multimeter between J26 test point A1 and test point A3.	(A1) and (A3)	Electronic multimeter indicates +28 vdc.	Proceed to step 4. If indication is normal, check the regulator and filter circuits.
4	Connect electronic multimeter across transformer T1 terminals 3 and 4, testpoint A4.	(A4)	Electronic multimeter indicates 35 vac.	Check continuity of transformer T1 secondary winding. If indication is abnormal, check bridge rectifier CR1 and circuit breaker CB2.

4 Adjustments and Alignments. Refer to paragraph 4-2c(1)(b)4 for the adjustments of potentiometer A1R8.

(c) Circuit (Stage) Description.

1 +28 Volt Voltage Regulator Circuit Group. Refer to the functional description for +28 Volt Voltage Regulator Circuit Group, paragraph 4-2c(1)(c).

2 Test Data. Refer to the test data in paragraph 4-2c(1)(c).

(2) Remote Low Power Indicator Functional Section. The troubleshooting data for the remote low power indicator functional section consists of a functional description, followed by test data. The functional description is based on detailed signal flow through the functional section and describes the operation of each circuit group with respect to the overall function of the remote

low power indicator functional section. The test data provides the information necessary to isolate the faulty circuits of this functional section.

(a) Description. The remote low power indicator functional section (see Figure 4-17) extends the remote low power indicator functions from Antenna Coupler, CU-1406/GRC, to test jacks on the front panel of Test Adapter, MX-8152/TYA-11. Positive 28-vdc power is applied from the Test Adapter power supply functional section through A1J1-W and -X to the low power indicator circuit of cavity 1. The remote low power indicator functions of cavity 1 are routed through A1J5-A, -B, and -C to test jacks J32, J2, and J3, respectively. When connector P1 is reconnected to A1J2, A1J3, or A1J4, +28-vdc power is applied to cavities 2, 3, or 4, respectively. The remote low power indicator functions of cavities 2, 3, or 4 are then available at test jacks J7 through J21.

(b) Test Data. If it has been determined that the remote low power indicator circuits are

defective, visually inspect the wiring and perform continuity tests using Multimeter, AN/PSM-4.

(3) Frequency Tuning Servo Functional Section. The troubleshooting data for the frequency tuning servo functional section consists of a functional description followed by test data. The functional description is based on detailed signal flow through the functional section and describes the operation of each circuit group with respect to the overall function of the frequency tuning servo functional section. The test data provide information necessary to isolate the faulty circuit group or detail part of the frequency tuning servo functional section.

(a) Description. The frequency tuning servo functional section (see Figure 4-18) applies the frequency tuning servo signals from Radio Set Control, C-3811/AR, to Antenna Coupler, CU-1406/GRC, distributes ac and dc power to Radio Set Control, C-3811/AR, and to Antenna Coupler, CU-1406/GRC, and provides control and test points required for the operation and testing of Antenna Coupler, CU-1406/GRC.

1 AC Power Distribution. Phase B ac power from the power supply functional section is distributed to relay contact K1B3, test jack J30, through J1-28 to Radio Set Control, C-3811/AR, and through P1-d to Antenna Coupler, CU-1406/GRC. Phase A ac power is distributed to test jack J29, and through P1-c to Antenna Coupler, CU-1406/GRC. The ac neutral line is distributed through chassis ground to test jacks J27 and 31, through J1-19 and -31 to Radio Set Control, C-3811/AR, and through P1-1, -b, and -j to Antenna Coupler, CU-1406/GRC.

2 DC Power Distribution. Positive 28 vdc is applied to relay terminal K1X1, test jack J25, through J1-14 and -37 to Radio Set Control, C-3811/AR, and through P1-n and -W to Antenna Coupler, CU-1406/GRC. The -28 vdc return is applied to test jack J28, through J1-18 to Radio Set Control, C-3811/AR, and through P1-X to Antenna Coupler, CU-1406/GRC.

3 Hundreds Ground Function. The hundreds relay ground function is applied from Radio Set Control, C-3811/AR, through J1-13 to relay terminal K1X2, test jack J11, and through P1-S to Antenna Coupler, CU-1406/GRC.

4 Adder Return and Tap 11 Voltage Functions. The adder return function is applied from Radio Set Control, C-3811/AR, through J1-29 to test jack J10 and relay contacts K1B1 and K1A3, and through P1-G to Antenna Coupler, CU-1406/GRC. The tap 11 voltage function is

applied from Radio Set Control, C-3811/AR, through J1-30 to test jack J28 and relay contact K1A1, and through P1-J to Antenna Coupler, CU-1406/GRC.

5 Low Track Function. Relay contact K1B2 selects either the tap 1 function or tap 2 function as a reference voltage, which is applied to test jack J16 and through P1-T to Antenna Coupler, CU-1406/GRC.

6 Tap Function. Relay contact K1A2 selects either the tap 2 function or the tap 11 function and applies it to test jack J17 and through P1-R to Antenna Coupler, CU-1406/GRC.

7 Tens, Units, and Tenths Functions. The tens, units, and tenths functions are routed from Radio Set Control, C-3811/AR, through J1-33, J1-35, and J1-34 to test jacks J4, J5, and J6, respectively. The functions are applied through P1-A, -C, and -E to Antenna Coupler, CU-1406/GRC.

8 Hundredths Voltage Function. The hundredths voltage function is applied from Radio Set Control, C-3811/AR, through J1-32 to test jack J12, and through P1-M to Antenna Coupler, CU-1406/GRC.

9 Ground Function. Connector pins J1-32, J1-19, P1-p, P1-b, and P1-j, and test jacks J27 and J31 provide a common connection for the chassis ground, tap 13 function, and ac neutral function.

10 High Track Function. The high track function is applied from Radio Set Control, C-3811/AR, through J1-31 to test jack J18, and through P1-N to Antenna Coupler, CU-1406/GRC.

11 Servo Malfunction. The servo malfunction signal (ground or +28 vdc) is applied from Antenna Coupler, CU-1406/GRC through P1-L to test jack J22.

12 Servo Command Ground Function. The servo command ground function is applied from Antenna Coupler, CU-1406/GRC, through P1-e to test jack J23.

13 Servo Position Gate Function. When relay K1 in the servoamplifier circuits of Antenna Coupler, CU-1406/GRC, is energized ground is applied through P1-h to test jack J24.

(b) Test Data. If it has been determined that the frequency tuning servo circuits are defective, visually inspect the wiring and perform continuity test using Multimeter, AN/PSM-4. See Figure 5-3 for parts location.

e. RADIO SET CONTROL, C-3811/AR OVER-ALL FUNCTIONAL DESCRIPTION. The troubleshooting data for Radio Set Control, C-3811/AR, consists of a functional description, followed by test data. The functional description is based on detail signal flow through Radio Set Control, C-3811/AR, and describes the operation of each circuit group with respect to the overall function of Radio Set Control, C-3811/AR. The test data provide information necessary to isolate the faulty circuits of Radio Set Control, C-3811/AR.

(1) Description. Radio Set Control, C-3811/AR, (see Figure 5-22) is intended for tuning Synthesizer-Receivers, O-1282(V)/GRC, when used in conjunction with Test Set Coupler, MX-8153/TYA-11. It also tunes Antenna Coupler, CU-1406/GRC when used in conjunction with Test Adapter, MX-8152/TYA-11. Operating frequencies between 225.00 and 399.95 mcs at intervals of 50 kc/s may be selected either manually by five thumbwheel rotary switches, or by a single control which selects any 1 of 20 preset frequency channels.

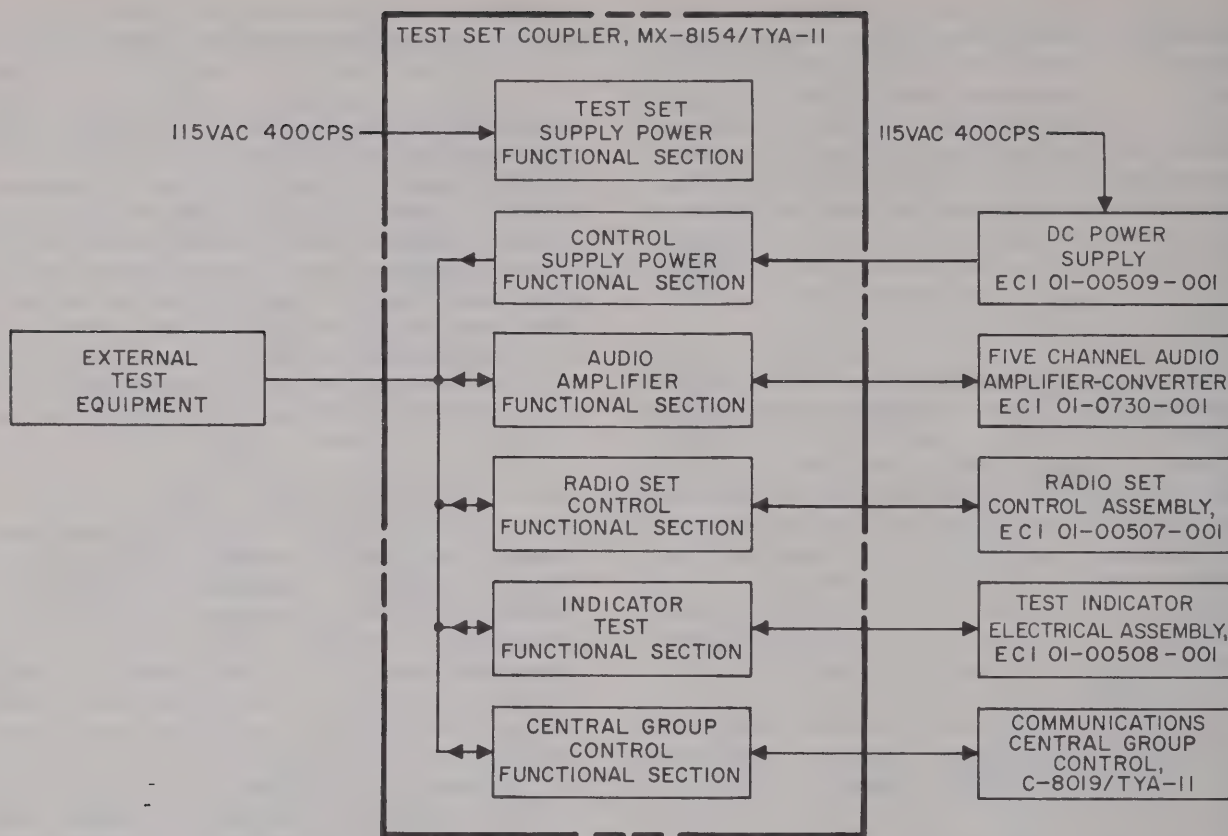
(a) Manual Frequency Selection. The frequency selection circuits consist of reference voltage autotransformer T1401, MANUAL SELECT switches S1404 through S1409, and units and tens inhibit relays K1401 and K1402. The input 115 vac power is applied from connector J1401-28 and -32 to T1401-1 and -13. Positive 28 vac power is applied to J1401-14 and -37 for distribution to indicators and to the frequency selection circuits. The frequency selection circuits provide a number of dc control voltages and ac tuning command voltages and reference voltages from the 120 vac phase B input. The ac tuning command voltages are proportional to three digits of the operating frequency corresponding to tens, units, and tenths. The four reference voltages are the high track (two separate voltages), tap function, and low track voltages. All voltages are referenced to an ac common adder return which is applied to J1401-29. Transformer T1401 provides four reference voltages and three tuning command voltages. The tuning command voltages are selected by the tens, units, and tenths switches S1405-A, S1406-A, and S1407-A, and applied to connector J1401-33, -35, and -34, respectively. The two high track, tap function, and low track reference voltages are applied to J1401-31, -32, -30, and -28, respectively. When the hundreds switch S1404 is set to 2, a ground is applied to tens inhibit relay K1402, to J1401-13, and through switch S1405-B to units inhibit relay K1401. The tens inhibit relay K1402 and units inhibit relay K1401 become energized by the application of the ground, and prevent the selection of tuning

command voltages that correspond to an operating frequency less than the minimum of 225.00 mc. When the hundredths switch S1409 is set to 5, +28 vac is applied to connector J1401-36. The presence or absence of this voltage determines the hundredth digit (0.00 or 0.05 mc) of the operating frequency. The tenths switch S1407-B selects connector pins J1401-1 through -10 and applies +28 vdc through these pins to the external equipment for crystal selection. The even units switch S1406-B selects ground at even positions only. The presence of ground at even positions and the absence of ground at odd positions at J1401-15 determines the selection of the even or odd numbered banks of crystals in the external equipment.

(b) Preset Channel Selection. The preset channel switch S1401 consists of 52 stationary contacts grouped in sections S1401-A through -H, and a 20-position drum, rotated by the PRESET CHANNEL control. When a channel is selected, adjustable pins on the drum engage appropriate contacts in each section. The closed contacts determine the frequency of the selected channel. Twenty sets of adjustable pins allow the selection of twenty channels, each adjustable to 3500 different frequencies. Since the contacts in each section of the preset channel switch S1401-A through S1401-H are connected in parallel with the contacts in each section of the manually operated switches S1404 through S1409, the preset channel selection circuits are functionally similar to the manual frequency selection circuits.

(2) Test Data. If it has been determined that the circuits of Radio Set Control, C-3811/AR, are defective, visually inspect the wiring and perform continuity checks using Multimeter, AN/PSM-4. See Figure 5-9 for parts location.

4-3. TEST SET COUPLER, MX-8154/TYA-11, OVERALL FUNCTIONAL DESCRIPTION. The overall troubleshooting data for Test Set Coupler, MX-8154/TYA-11 (Test Set Coupler) consists of a functional description. The functional description is based on major signal flow through the Test Set Coupler during the testing of Radio Set Control Assembly, ECI 01-00507-001, Indicator Test Electrical Assembly, ECI 01-00508-001, DC Power Supply, ECI 01-00509-001, Five Channel Audio Amplifier-Converter, ECI 01-00730-001, and Communications Central Group Control, C-8019/TYA-11. The Test Set Coupler (see Figure 4-5) consists of the radio set control functional section, indicator test functional section, control power supply functional section, audio amplifier functional section, central group control functional section, and the Test Set Coupler power supply functional section.



54563-5-64

Figure 4-5. Test Set Coupler, MX-8154/TYA-11, Overall Block Diagram

Each functional section, in conjunction with the external test equipment, (not supplied) performs the testing of the corresponding unit of the AN/TYA-11 by applying input signals from the external equipment (not supplied) to the equipment under test, and applying the output signals from the equipment under test to the external test equipment (not supplied). Controls, associated with the functional sections, establish the required operating modes and the indicators verify the operational status of circuits in the equipment under test. The Test Set Coupler receives 115v, 400 cps power and supplies ac and dc power through its functional sections to the units of the AN/TYA-11. Each unit of the AN/TYA-11 is connected to the Test Set Coupler, one at a time, through one or more Test Set Coupler cables.

a. **TEST SET COUPLER POWER SUPPLY FUNCTIONAL SECTION.** The troubleshooting data for the power supply functional section of the Test Set Coupler consists of a functional description, followed by test data. The functional description is based on detail signal flow through the functional section and describes

the operation of each circuit group. The test data provides the information necessary to isolate the faulty circuit group or detail part of the Test Set Coupler power supply functional section.

(1) **Description.** The Test Set Coupler power supply functional section (see Figure 4-19) comprises the circuits of the +26.5 vdc power supply, -12 vdc power supply, +5.1 vdc power supply, and the ac power supply. The +26.5 vdc power supply provides an additional output of +12 vdc and the +5.1 vdc power supply provides an additional output of +1.6 vdc. The dc return of each power supply is connected to a common ground. The Test Set Coupler power supply functional section receives 115 vac power from POWER connector J7-1 and -3, which is applied through AC POWER circuit breaker CB1 to AC POWER indicator DS22. The 115 vac power is also applied to transformers T1, T2, and T3, the loading functional section and to the control-power supply functional section. Transformer T1 is shared by the +26.5 and the -12 vdc power supplies. The step-down voltage from transformer terminal T1-3 and T1-4 is applied across

bridge rectifier CR1 through CR4. The rectifier output voltage is applied through circuit breaker CB2 to filter L1 and C1. Filtered +26 vdc is applied to DC POWER indicator DS23, test point TP12, radio set control functional section, indicator test functional section, and to the audio amplifier functional section. The filtered +26 vdc power is also applied to the +12 vdc regulator circuit group. Regulated +12 vdc power is applied to test point TP13, radio set control functional section and to the indicator test functional section. The step-down voltage from transformer terminals T1-5 and T1-6 is applied across bridge rectifier CR5 through CR8. The rectifier output voltage is applied through DC POWER circuit breaker CB2 to filter L2 and C2. Breakdown diode CR9 maintains the filtered voltage output at -12 vdc. The output voltage is routed to test point TP14, radio set control functional section, indicator test functional section, and to the audio amplifier functional section. The step-down voltage from transformer terminals T3-3, -5 and T3-4, -6 is applied across bridge rectifier CR10 through CR13. The rectified output is applied through DC POWER circuit breaker CB2 to filter R2 and C4. Breakdown diode CR14 maintains the filtered voltage output at +5.1 vdc. Filtered +5.1 vdc is routed to test point TP15, radio set control functional section, and to the audio amplifier functional section. The filtered +5.1 vdc is also applied across voltage divider R3, CR16, and CR15 which produces a +1.6 vdc output. The +1.6 vdc potential is routed to test point TP16, and to the radio set control functional section. Transformer T2 supplies four step-down voltages with respect to ground; 24 vac at T1-5, 12 vac at T1-6, 12 vac at T1-9 and 24 vac at T1-10. The four ac outputs are routed to the remote control functional section.

(2) Test Data. If it has been determined that the Test Set Coupler power supply functional section is defective, trace the signal path through the power supply circuits. To isolate the trouble to a circuit group or detail part, perform the steps of procedure in Table 4-3. See Figure 4-19 for test points and Figure 5-11 for parts location.

(a) Test Equipment. Test equipment required for performing the trouble isolation procedures is as follows:

1. Multimeter, AN/PSM-4
2. Electronic Multimeter, AN/USM-116.

(b) Test Setup.

- 1 Set all rotary switches to the off or 1 position.

2 Set all toggle switches to the down or off position.

3 Connect cable W8 to the Test Set Coupler and the power source.

4 Set AC POWER and DC POWER switches to the ON position.

(c) Adjustments and Alignments. Potentiometer A1R7 is a screwdriver adjustment which is set for a +12 vdc output of the +12 volt regulator circuit. Refer to Section 5 for adjustment procedures.

(3) +12 Volt Regulator Circuit Group. The circuits of the +12 volt regulator are located on subassembly A1, ECI 61-00967-001. Transistor Q1, which forms a part of the regulator, is located outside of subassembly A1. The troubleshooting data for the +12 volt regulator circuit group consists of a functional description, followed by test data.

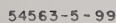
(a) Description. The +12 volt regulator circuit (see Figure 4-6) reduces +26.5 vdc to +12 vdc and provides current limiting and voltage regulation of the +12-volt output. Current flowing through the series combination of Q1 and A1R3 produces a voltage drop which reduces the applied +26.5 vdc to +12 vdc at the output terminals of the regulator circuit. A control signal, applied to the base of A1Q1, varies the voltage drop across A1Q1 in accordance with the variations in the regulator output voltage. A sample of the regulator output voltage is applied from potentiometer A1R7 to pin 6 of the control circuits located on subassembly A1A1. The resultant control signal is applied from pin 2 of A1A1 to the base of transistor A1Q1. The amplified signal is applied from the collector of A1Q to the base of Q1.

(b) Test Data. If it has been determined that the +12 volt regulator circuit group is defective isolate the defective stage by performing voltage measurements at test points shown in Figure 4-6. See Figure 5-12 for parts location.

b. CONTROL-POWER SUPPLY FUNCTIONAL SECTION. The troubleshooting data for the control-power supply functional section consists of a functional description, followed by test data. The functional description is based on detail signal flow through the control-power supply functional section during the testing of DC Power Supply, ECI 01-00509-001. The test data provide the information necessary to isolate the faulty circuit or detail part of the control-power functional section.

TABLE 4-3. TEST SET COUPLER, MX-8154/TYA-11, POWER SUPPLY, TROUBLE ISOLATION

STEP	PRELIMINARY ACTION	TEST POINT	NORMAL INDICATION	IF INDICATION IS ABNORMAL
1	Connect Electronic Multimeter, AN/USM-116, between TP12 and TP18, to measure +26.5 vdc.	(B) and (A)	Electronic multimeter indicates +26.5, ± 4 vdc.	Check filter L1, C1, and bridge rectifier CR1 thru CR4.
2	Connect electronic multimeter between T1-3 and T1-4, to measure 30 vac.	(C)	Electronic multimeter indicates 30 vac.	Check continuity of transformer T1 secondary.
3	Connect electronic multimeter between TP13 and TP18 to measure +12 vdc.	(D) and (A)	Electronic multimeter indicates +12.0 ± 0.3 vdc.	Check regulator circuit group.
4	Connect electronic multimeter between TP14 and TP18 to measure -12 vdc.	(E) and (A)	Electronic multimeter indicates -12, ± 1 vdc.	Check filter L2, C2 and bridge rectifier CR5 thru CR8.
5	Connect electronic multimeter between T1-5 and T1-6 to measure 18.0 vac.	(F)	Electronic multimeter indicates 18.0 vac.	Check continuity of transformer T1 secondary.
6	Connect electronic multimeter between TP15 and TP18 to measure +5.1 vdc.	(G)	Electronic multimeter indicates +5.1, ± 0.4 vdc.	Check filter C2, C4 and diode CR14, bridge rectifier CR10 thru CR13.
7	Connect electronic multimeter between T3-3, -5, and T3-4, -6 to measure 10.0 vac.	(H)	Electronic multimeter indicates 10.0 vac.	Check continuity of transformer T3 secondary.
8	Connect electronic multimeter between TP16 and TP18 to measure +1.6 vdc.	(I)	Electronic multimeter measures +1.6 vdc.	Check R3, CR16, and CR15.
9	Connect electronic multimeter between T2-5 and T2-10 to measure 48 vac.	(J)	Electronic multimeter indicates 48 vdc.	Check continuity of transformer T2 secondary.



(3) Receiver Audio Functional Section. The troubleshooting data for the receiver audio functional section consists of a functional description, followed by test data. The functional description is based on detailed signal flow through the functional section and describes the operation of each circuit group with respect to the overall function of the receiver functional section. The test data provide the information necessary to isolate the faulty circuit group or detail part of the receiver functional section.

(a) Description. (See Figure 4-21.) Audio test signal is applied to INPUT jack J31 and through TEST SELECT switch S17-A5 to the primary of transformer T1, located on subassembly A4. The transformer secondary applies the signal through SELECTOR switch S15-C2 and S15-D2 to CHANNEL switch S16-C and S16-B. Wafers S16-C and S16-B apply the signal to radio 1-5 receiver audio inputs A and B of the Audio Amplifier-Converter at P12-X and -Y for radio 1, P12-G and -b for radio 2, P12-L and -d for radio 3, P12-R and -g for radio 4, and P12-W and -i for radio 5. Radio 1-5 remote audio A outputs are applied from P11-A, -E, -H, -L, and -P to CHANNEL switch S16-D. Switch S16-D routes the signal through SELECTOR switch S15-E2 and TEST SELECT switch S17-B5 to OUTPUT jack J33. Switch S15-H2 switches load resistor A5R8 between S15-E2 and ground. Radio 1-5 remote audio B outputs are routed from P11-B, -D, -G, -K, and -N to ground through CHANNEL switch S16-E and SELECTOR switch S15-F.

(b) Test Data. If it has been determined that the receiver audio functional section is defective, visually inspect the wiring and perform resistance and continuity tests using Multimeter, AN/PSM-4. Replace a suspected plug-in unit with one known to be good. See Figure 5-11 for parts location.

(4) Remote Audio Functional Section. The troubleshooting data for the remote audio functional section consists of a functional description, followed by test data. The functional description is based on detailed signal flow through the functional section and describes the operation of each circuit group with respect to the overall function of the remote functional section. The test data provide the information necessary to isolate the faulty circuit group or detail part of the remote audio functional section.

(a) Description. (See Figure 4-22.) Audio test signal is applied to INPUT jack J31 and through TEST SELECT switch S17-A5 to the primary of transformer T1, located on subassembly A4. The transformer secondary applies the signal through SELECTOR switch S15-C and S15-D to CHANNEL switch S16-D and S16-E. Switch S16 applies the signal to radio 1-5 remote audio inputs A and B of Audio Amplifier-Converter at P11-A and -B for radio 1, P11-D and -E for radio 2, P11-G and -H for radio 3, P11-K and -L for radio 4, and P11-N and -P for radio 5. Radio 1-5 xmtr audio A outputs are applied from P12-B, -F, -K, -P, and -U to CHANNEL switch S16-A. Switch S16-A routes the signal through SELECTOR switch S15-E3 and TEST SELECT switch S17-B5 to OUTPUT jack J33.

Switch S15-H3 switches load resistor A5R9 between S15-E3 and ground. Radio 1-5 xmtr audio B outputs are routed from P12-A, -E, -J, -N, and -T to ground. Common ground is applied to radio 1-5 keylines at P12-D. Individual keylines exit at the Audio Amplifier-Converter at P11-C, -F, -J, -M, and -R and apply ground through CHANNEL switch S16-I to XMTR KEYING indicator DS21. Positive 5.1 vdc keying bias is applied through SELECTOR switch S15-G3 to the center tap of transformer A4T1 secondary and is routed to the Audio Amplifier-Converter with the input signal. The operation of the remote audio functional section with the SELECTOR switch in position 4 is the same as in position 3, except that SELECTOR switch S15-H4 switches load resistor A5R10 between S15-4 and ground.

(b) Test Data. If it has been determined that the remote audio functional section is defective, visually inspect the wiring and perform resistance and continuity tests using Multimeter, AN/PSM-4. Replace a suspected plug-in unit with one known to be good. See Figure 5-11 for parts location.

(5) External Audio Functional Section. The troubleshooting data for the external audio functional section consists of a functional description, followed by test data. The functional description is based on detailed signal flow through the functional section and describes the operation of each circuit group with respect to the overall function of the external functional section. The test data provide the information necessary to isolate the faulty circuit group or detail part of the external functional section.

(a) Description. (See Figure 4-23.) Audio test signal is applied to INPUT jack J31 and switched by TEST SELECT switch S17-A5 to the primary of transformer T1, located on subassembly A4. The transformer secondary applies the signal through SELECTOR switch S15-D5 and S15-C5 across resistor A5R3, connected between pins 32 and 31 on subassembly A5. The signal is routed from pin A5-32 through SELECTOR switch S15-J5 to CHANNEL switch S16-F, and from pin A5-31 to switch S16-G. Wafers S16-F and S16-G apply the signal to radio 1-5 ext audio inputs A and B of the Audio Amplifier-Converter at P11-V and -W for radio 1, P11-Y and -Z for radio 2, P11-b and -c for radio 3, P11-e and -f for radio 4, and P11-h and -i for radio 5. Radio 1-5 xmtr audio A outputs are applied from P12-B, -F, -K, -P, and -U to CHANNEL switch S16-A. Switch S16-A routes the signal through SELECTOR switch S15-E5 and TEST SELECT switch S17-B5 to OUTPUT jack J33. Switch S15-H5 switches load resistor A5R9 between S15-E5 and ground.

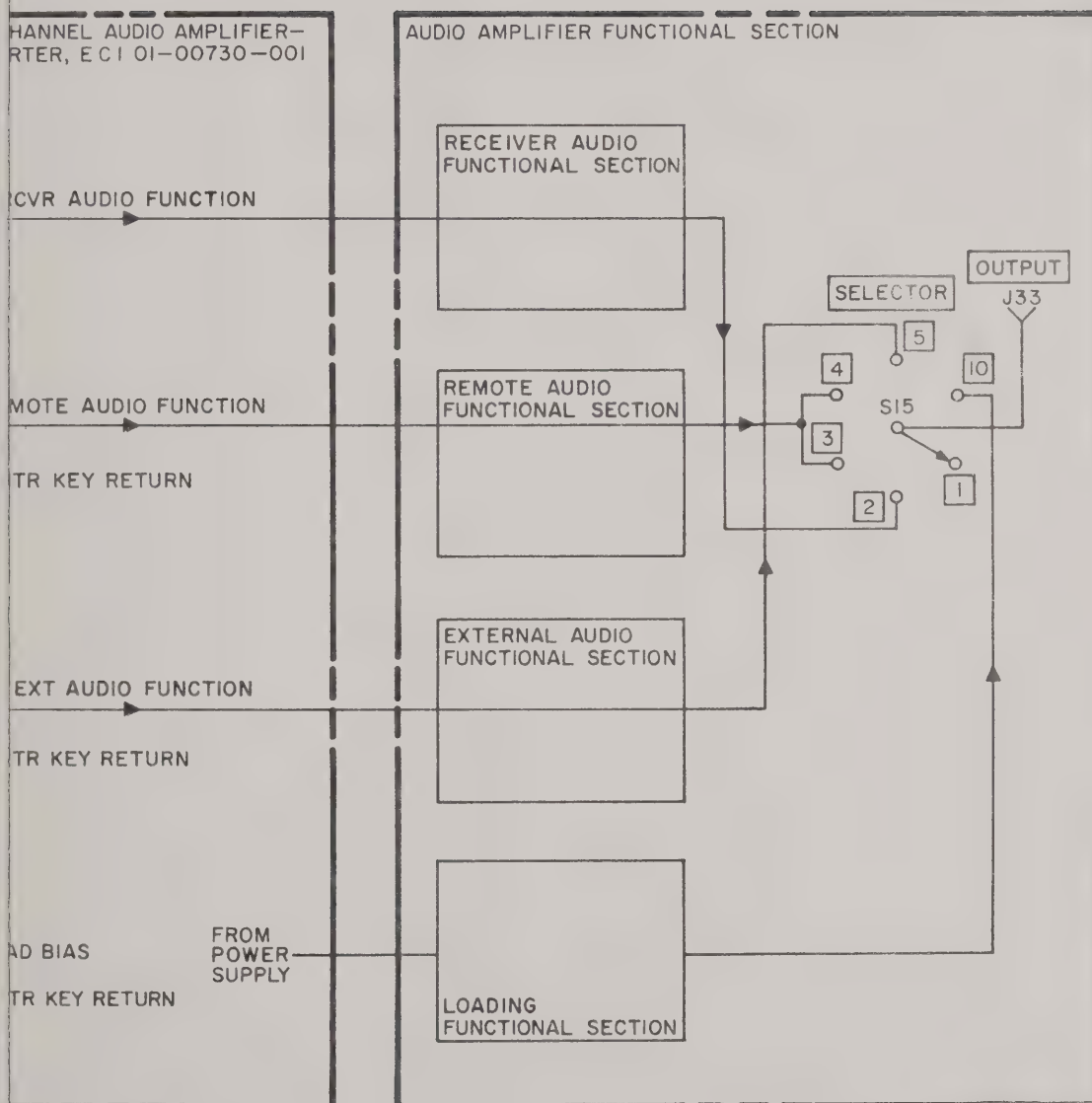


Figure 4-7. Audio Amplifier Functional Section, Overall Block Diagram

(a) Description. (See Figure 4-21.) Audio test signal is applied to INPUT jack J31 and through TEST SELECT switch S17-A5 to the primary of transformer T1, located on subassembly A4. The transformer secondary applies the signal through SELECTOR switch S15-C2 and S15-D2 to CHANNEL switch S16-C and S16-B. Wafers S16-C and S16-B apply the signal to radio 1-5 receiver audio inputs A and B of the Audio Amplifier-Converter at P12-X and -Y for radio 1, P12-G and -b for radio 2, P12-L and -d for radio 3, P12-R and -g for radio 4, and P12-W and -i for radio 5. Radio 1-5 remote audio A outputs are applied from P11-A, -E, -H, -L, and -P to CHANNEL switch S16-D. Switch S16-D routes the signal through SELECTOR switch S15-E2 and TEST SELECT switch S17-B5 to OUTPUT jack J33. Switch S15-H2 switches load resistor A5R8 between S15-E2 and ground. Radio 1-5 remote audio B outputs are routed from P11-B, -D, -G, -K, and -N to ground through CHANNEL switch S16-E and SELECTOR switch S15-F.

(b) Test Data. If it has been determined that the receiver audio functional section is defective, visually inspect the wiring and perform resistance and continuity tests using Multimeter, AN/PSM-4. Replace a suspected plug-in unit with one known to be good. See Figure 5-11 for parts location.

(4) Remote Audio Functional Section. The troubleshooting data for the remote audio functional section consists of a functional description, followed by test data. The functional description is based on detailed signal flow through the functional section and describes the operation of each circuit group with respect to the overall function of the remote functional section. The test data provide the information necessary to isolate the faulty circuit group or detail part of the remote audio functional section.

(a) Description. (See Figure 4-22.) Audio test signal is applied to INPUT jack J31 and through TEST SELECT switch S17-A5 to the primary of transformer T1, located on subassembly A4. The transformer secondary applies the signal through SELECTOR switch S15-C and S15-D to CHANNEL switch S16-D and S16-E. Switch S16 applies the signal to radio 1-5 remote audio inputs A and B of Audio Amplifier-Converter at P11-A and -B for radio 1, P11-D and -E for radio 2, P11-G and -H for radio 3, P11-K and -L for radio 4, and P11-N and -P for radio 5. Radio 1-5 xmtr audio A outputs are applied from P12-B, -F, -K, -P, and -U to CHANNEL switch S16-A. Switch S16-A routes the signal through SELECTOR switch S15-E3 and TEST SELECT switch S17-B5 to OUTPUT jack J33.

Switch S15-H3 switches load resistor A5R9 between S15-E3 and ground. Radio 1-5 xmtr audio B outputs are routed from P12-A, -E, -J, -N, and -T to ground. Common ground is applied to radio 1-5 keylines at P12-D. Individual keylines exit at the Audio Amplifier-Converter at P11-C, -F, -J, -M, and -R and apply ground through CHANNEL switch S16-I to XMTR KEYING indicator DS21. Positive 5.1 vdc keying bias is applied through SELECTOR switch S15-G3 to the center tap of transformer A4T1 secondary and is routed to the Audio Amplifier-Converter with the input signal. The operation of the remote audio functional section with the SELECTOR switch in position 4 is the same as in position 3, except that SELECTOR switch S15-H4 switches load resistor A5R10 between S15-4 and ground.

(b) Test Data. If it has been determined that the remote audio functional section is defective, visually inspect the wiring and perform resistance and continuity tests using Multimeter, AN/PSM-4. Replace a suspected plug-in unit with one known to be good. See Figure 5-11 for parts location.

(5) External Audio Functional Section. The troubleshooting data for the external audio functional section consists of a functional description, followed by test data. The functional description is based on detailed signal flow through the functional section and describes the operation of each circuit group with respect to the overall function of the external functional section. The test data provide the information necessary to isolate the faulty circuit group or detail part of the external functional section.

(a) Description. (See Figure 4-23.) Audio test signal is applied to INPUT jack J31 and switched by TEST SELECT switch S17-A5 to the primary of transformer T1, located on subassembly A4. The transformer secondary applies the signal through SELECTOR switch S15-D5 and S15-C5 across resistor A5R3, connected between pins 32 and 31 on subassembly A5. The signal is routed from pin A5-32 through SELECTOR switch S15-J5 to CHANNEL switch S16-F, and from pin A5-31 to switch S16-G. Wafers S16-F and S16-G apply the signal to radio 1-5 ext audio inputs A and B of the Audio Amplifier-Converter at P11-V and -W for radio 1, P11-Y and -Z for radio 2, P11-b and -c for radio 3, P11-e and -f for radio 4, and P11-h and -i for radio 5. Radio 1-5 xmtr audio A outputs are applied from P12-B, -F, -K, -P, and -U to CHANNEL switch S16-A. Switch S16-A routes the signal through SELECTOR switch S15-E5 and TEST SELECT switch S17-B5 to OUTPUT jack J33. Switch S15-H5 switches load resistor A5R9 between S15-E5 and ground.

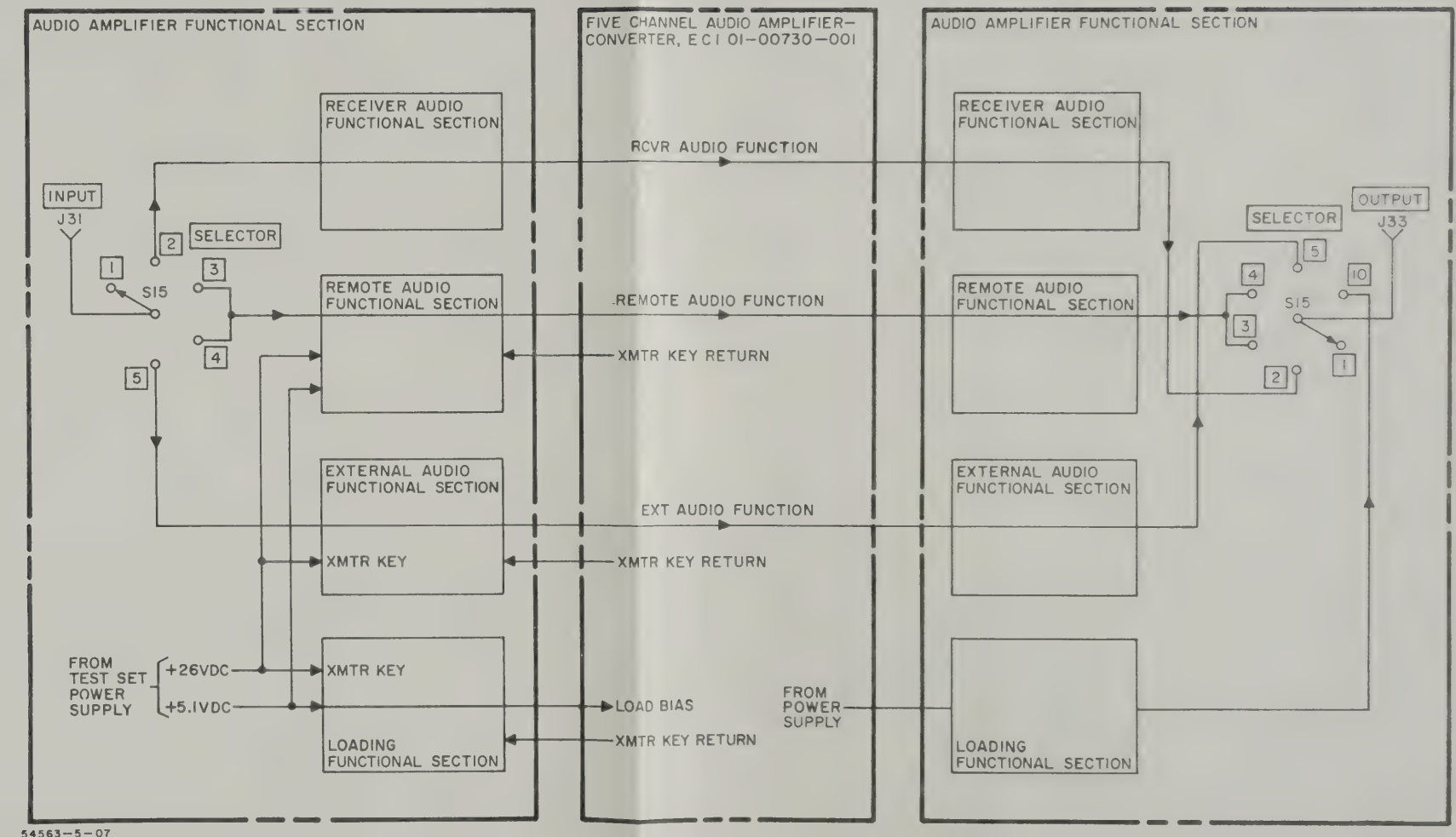


Figure 4-7. Audio Amplifier Functional Section, Overall Block Diagram

Radio 1-5 xmtr audio B outputs are routed from P12-A, -E, -J, -N, and -T to ground. Common ground is applied to radio 1-5 xmtr keylines at P12-D. Individual keylines exit the Audio Amplifier-Converter at P11-C, -F, -J, -M, and -R and apply ground through CHANNEL switch S16-I to XMTR KEYING indicator DS21. Ground to relays 1-5 is applied from SELECTOR switch S15-I through CHANNEL switch S16-H to P11-q, -t, -u, -x, and -y.

(b) Test Data. If it has been determined that the external audio functional section is defective, visually inspect the wiring and perform resistance and continuity tests using Multimeter, AN/PSM-4. Replace a suspected plug-in unit with one known to be good. See Figure 5-11 for parts location.

(6) Loading Functional Section. The troubleshooting data for the loading functional section consists of a functional description, followed by test data. The functional description is based on detailed signal flow through the functional section and describes the operation of each circuit group with respect to the overall function of the loading functional section. The test data provide the information necessary to isolate the faulty circuit group or detailed part of the loading functional section.

(a) Description. (See Figure 4-24.) Positive 5.1 vdc bias potential is applied from the Test Set Coupler power supply through LOADING SWITCH S18 to P11-A, -D, -G, -K, and -R. The output of the Audio Amplifier-Converter power supply is routed from P12-C through SELECTOR switch S15-E10, TEST SELECT switch S17-B5, to OUTPUT jack J33.

(b) Test Data. If it has been determined that the loading functional section is defective, visually inspect the wiring and perform continuity tests using Multimeter, AN/PSM-4. See Figure 5-11 for parts location.

d. RADIO SET CONTROL FUNCTIONAL SECTION. The troubleshooting data for the radio set control functional section consists of a functional description, followed by test data. The functional description is based on detail signal flow through the radio set control functional section during the testing of Radio Set Control Assembly, ECI 01-00507-001. The test data provide information necessary to isolate the faulty circuit part of the radio set control functional section.

(1) Description. The radio set control functional section (see Figure 4-25, sheets 1 and 2)

tests the remote receiver audio functions, handset listen, talk, and control functions, local and remote preset channel code functions, transmitter keying functions, and the remote status indicator functions of the Radio Set Control Assembly. The radio set control functional section applies dc power, test signals, timing pulses, and the preset channel code to Radio Set Control Assembly and applies the test results to an external ac electronic multimeter and to Test Set Coupler indicators for observation.

(a) Dc Power Distribution. DC power from the Test Set Coupler power supply functional section is distributed as follows: Positive 26.5 vdc is applied to subassembly A3, indicators DS1, and DS3 through DS9, and to connector P15-A. Positive 12 vdc is applied to subassembly A5 and to connector P15-E. Positive 5.1 vdc is applied to subassembly A3 and to connector P15-N. Positive 1.6 vdc is applied to connector P15-K. Negative 12 vdc is applied to connector P15-T.

(b) Remote Power On Return. Ground for POWER indicator DS3 is routed from connector P15-G to P15-W, and through P15-X to D53.

(c) Receiver Audio Function. An audio test signal, applied from an external signal generator to INPUT jack J31, is routed through TEST SELECT switch S17-A2 to INPUT switch S3-B. In position 1 of INPUT switch S3-B, the signal is applied to AUDIO switch S1J which selects one of five radio receiver inputs to Radio Set Control Assembly at connector P13-L, -N, -S, -T, and -V. The receiver audio signal exits Radio Set Control Assembly at P11-T and -S for radio 1, P11-V and -U for radio 2, P11-X and -W for radio 3, P11-Z and -Y for radio 4, and P11-b and -a for radio 5. AUDIO switch wafers S1-E and S1-F select the desired radio lines and apply the audio signal to transformer T1, located on subassembly A5. The audio signal is routed through INPUT switch S3-A1 and TEST SELECT switch S17-B2 to OUTPUT jack J33, which is connected to an external dc electronic multimeter.

(d) External Phone Audio and Keying Ground Function. In position 2 of INPUT switch S3-B, the audio signal is applied to transformer T2, located on subassembly A4. From transformer A4T2, the signal is applied to AUDIO switch wafer S1-D, which selects one of radio 1-5 lines. The signal is routed to Radio Set Control Assembly at connector P11-d, -f, -h, -k, and -n. The external phone audio signal exits Radio Set Control Assembly at connector P12-J and -K for radio 1, P12-L and -M for radio 2, P12-N and -P for radio 3, P12-R

and -S for radio 4, and P12-T and -U for radio 5. AUDIO switch wafers S1-H and S1-I select the desired radio lines and apply the audio signal to transformer T2, located on subassembly A5. The audio signal is routed through INPUT switch S3-A2 and TEST SELECT switch S17-B2 to OUTPUT jack J33. When KEY 1 switch S1 is pressed, ground is applied through resistor A4R3 to the external phone audio line. The ground potential is routed with the external phone audio signal through Radio Set Control Assembly and exits as a positive keying potential, which is applied to P12-K, -M, -P, -S, and -U. The positive potential is applied through S1-I to transformer A5T2. The center tap of A5T2 conducts the ground potential to the base of transistor A5Q3 which lights KEYING indicator DS4.

(e) Handset Audio Listen Function. In position 3 of INPUT switch S3-B, the handset audio listen signal is applied to Radio Set Control Assembly through the same test set circuits as used by the receiver audio signal. The handset audio listen signal exits Radio Set Control Assembly at connector P16-A and is applied through relay A4K1 to INPUT switch S3-A3. Switch S3-A3 routes the signal through TEST SELECT switch S17-B to OUTPUT jack J33.

(f) Handset Audio Talk Function. In position 4 of INPUT switch S3-B, the handset audio talk signal is applied to transformer T3, located on subassembly A5. From A5T3 the signal is routed through PTT ON switch S5-8 to relay A4K2. Normally closed contacts of relay A4K2 apply the signal to P16-C. The handset audio talk signal for radio 1-5 exits Radio Set Control Assembly at connector P13-A, -C, -E, -G, and -J, and is applied to AUDIO switch S1-K. AUDIO switch S1-K selects the desired radio line and applies the signal to load resistor A4R4 and to INPUT switch S3-A3.

(g) Mike Bias and Transmitter Keying Functions. MIKE indicator DS1 verifies the proper operation of the headset microphone biasing circuit in Radio Set Control Assembly. Positive 12 vdc is applied from the Test Set Coupler, power supply to Radio Set Control Assembly at P15-A and exits at P16-C as the microphone bias. The bias is routed from P16-C through relay A4K2 contacts 3 and 7, PTT ON switch S5-B, and is applied to the base of transistor A5Q1. The positive potential causes the transistor to conduct and to apply a ground return for MIKE indicator DS1. XMIT indicator DS5 verifies the proper operation of the transmitter keying circuit in Radio Set Control Assembly. Transmitter keying ground for radios

1-5 from Radio Set Control Assembly is applied through P16-X, -a, -c, -e, and -g to AUDIO switch S1-L. AUDIO switch S1-L selects the desired radio line and applies the transmitter keying ground to XMIT indicator DS5.

(h) Remote Preset Channel Code Function. CODE switch wafers S2-A, -B, -C, and -D select the required combination of ground and -12 vdc levels to generate the remote preset channel code at each of the 10 positions of the CODE switch. The code voltage levels are attenuated by resistors A3R22 through A3R25 and applied to CHANNEL ACTIVATE momentary contact switch S9. The CHANNEL ACTIVATE switch applies the code to RADIO switch S4, wafers E, F, G, and H. Each wafer applies one channel code bit to a radio through connector P11. The remote preset channel code output of Radio Set Control Assembly is applied to connector P14 in four groups corresponding to radios 1-4. For example, radio 1 code is applied to P14-A, -B, -C, and -D. The code in each radio group is applied from P14 to RADIO switch S4, wafers I, J, K, and L. Switch S4 applies the code voltage levels to four light drivers located on subassembly A2. Each light driver is connected to a CODE indicator lamp, DS6 through DS9, which lights whenever the output of a light driver is at ground potential. The timing pulse generator, located on subassembly A3, generates timing pulses for the preset channel code circuits of Radio Set Control Assembly. The timing pulses are applied from pin A3-10 to connector P15-M.

(i) Local Preset Channel Code Function. The local present channel code, generated in Radio Set Control Assembly, is applied to the Test Set Coupler at connector P14 and is routed through the Test Set Coupler as described in the previous paragraph.

(j) Remote in Use Indicator Function. AUDIO switch S1-G selects the ground for radio 1-5 IN USE indicators on Radio Set Control Assembly, and applies it to P12-A, -B, -C, -D, and -E.

(k) Out of Service Indicator Function. Momentary contact OUT OF SERVICE switch S8 receives ground from P14-f, -d, -b, and -z and applies it through P14-X, -a, -c, and -e to the out of service indicator circuits in Radio Set Control Assembly.

(2) Test Data. If it has been determined that the radio set control functional section is defective, visually inspect the wiring and perform continuity tests using Multimeter, AN/PSM-4. Replace a suspected plug-in unit with one known to be good. Check the output waveform of the timing pulse generator at pin A3-10

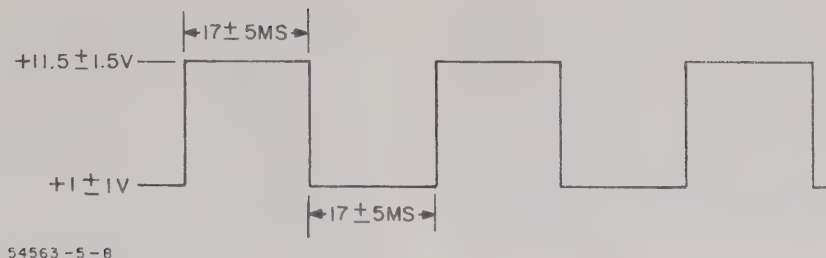


Figure 4-8. Timing Pulse Generator Output Waveform

with Oscilloscope, Fairchild 765MH. See Figure 4-8 for the desired waveform.

(3) Circuit (Stage) Description. As a further aid in the description of the radio set control functional section, the applicable circuits located on subassemblies A2, A3, and A5 are discussed in order of signal flow.

(a) Light Drivers. Four light driver circuits, associated with the CODE indicators (see Figure 5-25) are located on plug-in unit subassembly Light Drivers, ECI 61-00943-001, designated A2. Since the four light driver circuits are identical, only the circuit associated with CODE 1 indicator is described. The light driver circuit contains an inverter Q1 and an inverter-driver Q13. In the inactive condition, ground potential is applied to the base of Q1 from pin 24 which turns on Q1. Ground potential is applied from the collector of Q1 to the base of Q13, which is cut off and presents an open circuit to the external CODE lamp. When a -12 vdc potential is applied to the base of Q1, the transistor is cut off and applies +12 vdc to Q13. Q13 conducts and applies a ground to the external CODE lamp.

(b) Timing Pulse Generator. The timing pulse generator circuit (see Figure 5-26) associated with the channel preset code function is located on plug-in unit subassembly Pulse Generator and Sync Circuitry, ECI 61-00942-001, designated A3. The timing pulse generator circuit consists of flip-flop Q1 and Q2, and driver Q5. Diodes CR1 and CR11 clamp the flip-flop output to +5.1 vdc. The timing pulse generator output waveform is applied to pin 10.

(c) Transformers and Light Drivers. The transformers and light driver circuits (see Figure 5-28) associated with the mike bias and transmitter keying functions are located on plug-in unit subassembly Transformers and Light Drivers, ECI 61-00945-001, designated A5. The microphone bias circuit group consists of transformer T3 and light driver Q1. Audio signal is applied from pin 35 to the primary winding of transformer T3. The secondary winding applies the audio signal through blocking capacitor

C3 to output pin 34. The +12 vdc mike bias is applied from pin 34 through isolating resistor R4 to the base of transistor Q1. Positive potential at the base turns the transistor on and provides a ground level at the collector, which is applied to pin 20. The transmitter keying circuit group consists of transformer T2 and light driver Q3. Audio signal is applied from pins 7 and 8 to the primary winding of transformer T2 through blocking capacitor C2. The secondary winding applies the audio signal to pin 9. The positive keying potential is routed from pin 8 through resistor R13 to the base of transistor Q3. Positive potential at the base turns the transistor on and provides a ground level at the collector, which is applied to pin 18.

(d) Test Data. If it has been determined that a plug-in unit is defective, perform resistance measurements using the Multimeter, AN/PSM-4. Measure the timing generator output waveform on Oscilloscope, Fairchild 765MH. See Figures 5-13, 5-14, and 5-16 for parts location.

e. INDICATOR TEST FUNCTIONAL SECTION. The troubleshooting data for the indicator test functional section consists of a functional description, followed by test data. The functional description is based on detail signal flow through the indicator test functional section during the testing of Indicator Test Electrical Assembly, ECI 01-00508-001. The test data provide information necessary to isolate the faulty circuit part of the indicator test functional section.

(1) Description. The indicator test functional section (see Figure 4-26, sheets 1 and 2) tests the status indicator functions, rf power test functions, data mode functions, external mode functions, and the test mode functions of Indicator Test Electrical Assembly. The indicator test functional section applies dc power to Indicator Test Electrical Assembly, checks the continuity of the signal lines and mode selection circuits using front panel indicators, and applies timing signals, generated in Indicator Test Electrical Assembly to an external oscilloscope for observation.

(a) DC Power Distribution. Dc power from the Test Set Coupler power supply functional section is distributed as follows: Positive 26.5 vdc is applied to subassembly A5, indicators DS10 through DS20, and through connector J2-40 to P15-g. Positive 12 vdc is applied to subassemblies A3 and A5, and through J2-42 to P15-m. Negative 12 vdc is applied to subassemblies A3 and A5, and through J2-43 to P15-p.

(b) Status Indicator Functions. Radio 1-4 VOICE status indicators on Indicator Test Electrical Assembly are energized by routing ground from P11-L to P11-M for radio 1, from P11-N to P11-P for radio 2, from P11-R to P11-S for radio 3, and from P11-U to P11-T for radio 4. Radio 1-4 DATA status indicators are energized by routing ground from P11-D to P11-C for radio 1, from P11-F to P11-E for radio 2, from P11-H to P11-G for radio 3, and from P11-J to P11-K for radio 4. Radio 5 VOICE status indicator is energized by routing ground from P11-X through P11-J, P11-K, and P15-Z to P11-V. The HUT PWR, AIR CON PWR NO.1 AIR CON PWR NO.2, AIR CON MAL, radio 1-4 RCVR CONN, XMTR CON/XMTR LOW PWR, and radio 5 XMTR LOW PWR status indicators are energized by pressing LIGHT TEST MASTER RESET switch S14. Contacts S14-3 and -5 apply ground simultaneously to P13-S, -B, -U, -E, -W, -H, -Z, -L, -N, -a, P11-a, -A, P12-c, -d, and -f. Positive 26.5 vdc is applied to these indicators from the Test Set Coupler power supply and distributed to P13-R, -C, -A, -T, -F, -D, -W, -J, -G, -X, -M, and -K.

(c) Rf Power Test Functions. The operation of radio 1-5 test keylines is verified by connecting each keyline in series with ground, an indicator, and +26.5 vdc power. TEST KEY switch S10-B applies ground to test keylines A at P12-L, -N, -R, -T, and -V. Wafer S10-A selects test keylines B at P12-M, -P, -S, -U, and -W and applies the ground to indicator 1, DS10, which receives +26.5 vdc from the Test Set Coupler power supply. The ground potential on the remote line to radio 5 test status indicator is routed through P11-g to indicator 11, DS20. The rf power test circuits are tested by applying +12 vdc to potentiometer R1 located on subassembly A5. The positive potential is routed from A5R1 through J2-23 and applied to P12-a and -b.

(d) Data Mode Functions. The operation of the data keylines, data xmtr, and data rcvr lines in the data mode is verified by connecting each data line in series with ground, an indicator, and +26.5 vdc power. Radio 1-4 data keylines A receive ground at P14-T, -V, -X,

and -a from SELECTOR CHECK switch S13, wafer A. The combined keylines exit Indicator Test Electrical Assembly at J2-c and connect to indicator 5, DS14 which receives +26.5 vdc from the test set power supply. Radio 1-4 data keylines B receive ground at P14-U, -W, -Z, and -b from wafer S13-B. The combined keylines exit Indicator Test Electrical Assembly at J2-D and connect to indicator 6, DS16. Radio 1-4 data xmtr A lines receive ground at P14-A, -C, -E, and -G from wafer S13-C. The combined data lines exit Indicator Test Electrical Assembly at J2-A and connect to indicator 3, DS12. Radio 1-4 data xmtr B lines receive ground at P14-B, -D, -F, and -H from wafer S13-D. The combined data lines exit Indicator Test Electrical Assembly at J2-B and connect to indicator 4, DS13. Radio 1-4 data rcvr A lines receive ground at P14-J, -L, -N, and -R from wafer S13-E. The combined data lines exit Indicator Test Electrical Assembly at J2-E and connect to indicator 7, DS16. Radio 1-4 data rcvr B lines receive ground at P14-K, -M, -P, and -S from wafer S13-F. The combined data lines exit Indicator Test Electrical Assembly at J2-F and connect to indicator 8, DS-17.

(e) External Phone Audio Function. The operation of ext phone audio lines, data keylines, and data xmtr lines in the external mode is verified by connecting the lines in series with ground, an indicator, and +26.5 vdc power. SELECTOR CHECK switch S13-F applies ground to radio 1-4 ext phone audio lines A and B, which enter Indicator Test Electrical Assembly at P15-N, and -P, P15-R and -S, P15-T and -U, and P15-V and -W. Audio lines A exit Indicator Test Electrical Assembly, combine at P15-A, -C, -E, and -G and connect to indicator 9, DS18. Audio lines B combines P15-B, -D, -F, and -H and connect to indicator 10, DS19. In the external mode of operation, data keylines and data xmtr lines are routed through the Test Set Coupler as described in the previous paragraph.

(f) RSCA Mode Function. In the RSCA mode of operation, data keylines and data xmtr lines are routed through the Test Set Coupler as described in the previous paragraph.

(g) Test Mode Functions. The RSCA timing signals from the TAOC timing circuits of Indicator Test Electrical Assembly are routed through P13-b to TIMING jack J18 for application to an external oscilloscope. The TAOC timing signals from the TAOC timing circuits are routed through P13-c, -d, -e, -f, -g, and -h to the circuits in subassembly A3. The output of A3 is applied to SCOPE SYNC jack J17 as a trigger pulse for the external oscilloscope. The

TAOC timing signals are observed at test jacks on Indicator Test Electrical Assembly. The operation of the simulator circuits of Indicator Test Electrical Assembly is verified by observing two test xmtr and two test keyline signals generated in the simulator. The test xmtr signal is routed over radio 1-4 data xmtr A lines to P14-A, -C, -E, and -G. XMIT TEST switch S11-A applies the signal to XMIT 1 jack J13. The other test xmit signal is routed over radio 1-4 data xmit B lines to P14-B, -D, -F, and -H. XMIT TEST switch S11-B applies the signal to XMIT 2 jack J14. The test keyline signal is routed over radio 1-4 data keylines A to P14-T, -V, -X, and -a. XMIT TEST switch S11-C applies the signal to KEY 1 jack J15. The other test keyline signal is routed over radio 1-4 data keylines B to P14-U, -W, -Z, and -b. XMIT TEST switch S11-D applies the signal to KEY 2 jack J16. The ground potential on the remote lines to radio 1-4 test status indicators is routed to P14-X, -a, -c, and -e. XMIT TEST switch S11-E applies the ground to indicator 2, DS11. The operation of the comparator circuits of Indicator Test Electrical Assembly is verified by routing the simulator test xmtr signals through the Test Set Coupler and applying them to the comparator circuits and to the ERROR and VALID indicators. The test xmtr signal is routed through P14-A to RECEIVE TEST switch S12-A, which applies it to radio 1-4 data rcvr A lines at P14-J, -L, -N, and -R. The other test xmtr signal is routed through P14-B to RECEIVE TEST switch S12-B which applies it to radio 1-4 data rcvr B lines at P14-K, -M, -P, and -S. When LIGHT TEST - MASTER RESET switch S14 is pressed, ground is applied through contacts 4 and 6 to P11-B.

(2) Test Data. If it has been determined that the indicator test functional section is defective, visually inspect the wiring and perform continuity tests using Multimeter, AN/PSM-4. Replace a suspected plug-in unit with one known to be good. See Figure 5-6 for parts location.

(3) Circuit (Stage) Description. As a further aid in the description of the indicator test functional section, the applicable circuits located on subassemblies A3 and A5 are discussed in order of signal flow.

(a) Sync Circuitry. The synchronization circuit group (see Figure 5-26) is located on plug-in unit subassembly Pulse Generator and Sync Circuitry, ECI 61-00942-001, designated A3. The synchronization circuit consists of six loading circuits CR2 through CR7, resistors R10 through R14, and capacitors C2 through

C7, an AND gate CR8, CR9, and CR10, and a buffer stage Q3 and Q4. The loading circuits are connected to pins 24 through 29 and to a common return at pins 33, 35. Timing pulses are applied to the AND gate at pins 24, 25, and 26. The AND gate output signal is applied to the base of Q3 and coupled to Q4. The output signal from the buffer stage is applied to pin 17.

(b) Voltage Divider. The voltage divider circuit (see Figure 5-28) is located on plug-in unit subassembly Transformers and Light Drivers, ECI 61-00945-001, designated A5. The voltage divider consists of potentiometer R1, connected between +12 vdc and ground, at pins 1, 2 and 23, 24, respectively. The slider of R1 is connected through resistor R2 to pin 3.

(c) Test Data. If it has been determined that a plug-in unit is defective, perform resistance measurements using the Multimeter, AN/PSM-4. See Figure 5-14 and 5-16 for parts location.

f. CENTRAL GROUP CONTROL FUNCTIONAL SECTION. The troubleshooting data for central ground control functional section consists of a functional description, followed by test data. The functional description is based on detail signal flow through the central group control functional section during the testing of Communications Central Group Control, C-8019/TYA-11. The test data provide information necessary to isolate the faulty circuit part of the central group control functional section.

(1) Description. The central group control functional section (see Figure 4-27) tests the intercom functions, local and remote xmit radio functions, preset channel code function, remote in use indicator function, keying signal function, and microphone bias function of the Communications Central Group Control, C-8019/TYA-11. The central group control functional section applies dc and ac power and test signals to Communications Central Group Control, C-8019/TYA-11, and applies the test results to an external ac electronic multimeter and to Test Set Coupler indicators for observation.

(a) Power Distribution. Ac and dc power from the Test Set Coupler power supply functional section is distributed as follows: Positive 12 vdc and -12 vdc is applied to subassembly A2, +26.5 vdc is applied to Test Set Coupler indicators and through J5-38 and J5-37 to subassembly A4. The 12 vac power is applied to P17-p and -r, and 24 vac is applied to P17-z and -m.

(b) Preset Channel Code Function. The preset channel code output of Communications Central Group Control, C-8019/TYA-11, is applied to connector P17 in four groups, corresponding to radios 1-4. For example, radio 1 code is applied to P17-S, -T, -u, and -V. The code in each radio group is applied from P14 to RADIO switch S4, wafers A, B, C, and D. Switch S4 applies the code voltage levels to four light drivers, located on subassembly A2. Each light driver is connected to a CODE indicator lamp, DS6 through DS9, which lights whenever the output of a light driver is at ground potential.

(c) Intercom Functions. The intercom functions of Communications Central Group Control are tested in the local talk-remote listen mode and in the remote talk-local listen mode. In the first mode of operation, the input signal (talk) is applied from P11-E to the local operator's connector J6-E, and the output signal (listen) is applied alternately from the remote operator's connectors J1-A through J5-A to P12-A. In the second mode of operation, the input signal (talk) is applied from P11-E alternately to the remote operator's connectors J1-E through J5-E, and the output signal (listen) is applied from the local operator's connector J6-A to P12-A. An audio test applied from the external signal generator to INPUT jack J31, is routed through TEST SELECT switch S17-A1 to transformer T3, located on subassembly A5. From A5T3, the signal is routed through PTT ON (push to talk) switch S5-B to relay A4K2. Normally-open contacts of relay A4K2 apply the signal to P11-E. The output signal exits Communications Central Group Control, C-8019/TYA-11, at connector P12-A and is routed through normally-open contacts of relay A4K2, IC switch S6-B6, TEST SELECT switch S17-B1, to OUTPUT jack J33.

(d) Transmit Radio Functions. In the transmit radio mode of operation, the audio test signal is routed from INPUT jack J31 to P11-E as described previously, and is applied alternately to connectors J1 through J6. The output signal exits Communications Central Group Control, C-8019/TYA-11, at P17-D and -B for radio 1, P17-E and -C for radio 2, P17-I and -G for radio 3, P17-J and -F for radio 4, and P17-K and -H for radio 5. AUDIO switch wafers S1-A and S1-B select the desired radio lines and apply the audio signal to transformer A5T4. The audio signal is routed through RADIO switch S6-B4, TEST SELECT switch S17-B1, to OUTPUT jack J33.

(e) Microphone Circuit Function. In the IC position, the IC-RADIO switch S6-A applies ground through relay contacts A4K1-9 and -12

to connector P11-B, and through relay contacts A4K2-13 and -10 to P12-B. In the RADIO position of S6-A, +20 vdc is routed from P11-F to P11-B and P12-B. The PTT ON-OFF switch S5-A selects either ground or +20 vdc and applies it through relay contacts A4K1-6 and -3 to P11-H.

(f) Remote In Use Indicator Function. Ground from radio 1-5 remote in use indicator lines is applied to P17-L, -M, -N, -O, and -P. The AUDIO switch S1-C applies it to the IN USE indicator DS2.

(g) Microphone Bias Function. Positive 12 vdc microphone bias is applied from Communications Central Group Control, C-8019/TYA-11, to P11-E and routed through relay contacts A4K1-5 and -2, and PTT-ON switch S5-B6, to the base of transistor A5Q1. The positive potential causes the transistor to conduct and to apply a ground return to MIKE indicator DS1.

(h) Keying Function. The keying signal is a positive potential which is applied to P17-D, -E, -I, and -K. AUDIO switch S1-B routes the signal through resistor A5R17 to the base of transistor A5Q2. The positive potential causes the transistor to conduct and to apply a ground return to KEYING indicator DS4.

(2) Test Data. If it has been determined that the central group control functional section is defective, visually inspect the wiring and perform continuity tests using the Multimeter, AN/PSM-4. Replace a suspected plug-in unit with one known to be good. See Figure 5-6 for parts location.

(3) Circuit (Stage) Description. As a further aid in the description of the central group control functional section, the applicable circuits located on subassemblies A2 and A5 are discussed in order of signal flow.

(a) Light Drivers. Refer to paragraph 4-3d(3)(a) for the description of the light driver circuits located on subassembly A2.

(b) Control Relays. Control relays associated with the central group control functional section are located on plug-in unit subassembly Transformers and Control Relay, ECI 61-00994-001, designated A4. See Figure 5-27 for schematic diagram.

(c) Transformers and Light Drivers. The transformer and light driver circuits (see Figure 5-28) associated with the microphone bias and keying signal functions are located on plug-in unit subassembly Transformers and Light Drivers, ECI 61-00945-001, designated A5. For

the description of the microphone bias circuit group, refer to paragraph 4-3e(3)(3). The keying signal circuit consists of transformer T4 and light driver Q2. Audio signal is applied from pins 5 and 6 through capacitor C4 to the primary winding of transformer T4. The secondary winding applies the audio signal to pin 4. The positive potential of the keying signal is applied from pin 6 through resistor R17 to the base of transistor Q2. Positive potential at the base of Q2 drives the transistor to saturation which applies a ground potential from the collector to pin 19.

(d) Test Data. If it has been determined that a circuit group on a plug-in unit is defective, perform resistance measurements using Multimeter, AN/PSM-4. See Figures 5-15 and 5-16 for parts location.

4-4. COMMUNICATIONS TEST KIT, MK-1104/TYA-11. The troubleshooting data for Communications Test Kit, MK-1104/TYA-11 consists of a functional description and test data for Test Adapter, MX-8158/TYA-11. The functional description is based on detailed signal flow through the Test Adapter during the testing of Five Channel Audio Amplifier-Converter, ECI 01-00730-001. The test data provide the information necessary to isolate the faulty circuits of the Test Adapter.

a. TEST ADAPTER, MX-8158/TYA-11, FUNCTIONAL DESCRIPTION. When Test Adapter, MX-8158/TYA-11, (see Figure 4-28, sheets 1 and 2) is inserted between Five Channel Audio Amplifier-Converter, ECI 01-00730-001, and its associated cables, it provides test jacks for monitoring the input and output signals to Five Channel Audio Amplifier-Converter, ECI 01-00730-001.

(1) Remote Audio. The remote audio lines conduct radio 1-5 remote audio signals between connector pins P3-A through P3-P and pins P1-A through P1-P, respectively. The remote audio signals are accessible at test jacks A-J1 through P-J14.

(2) Remote Keylines. Radio 1-5 remote keylines conduct keying ground potential between connector pins P3-C through P3-R and pins P1-C through P1-R, respectively. The keyline signals are accessible at test jacks C-J3 through R-J15.

(3) External Audio. The external audio lines conduct radio 1-5 external audio signals between connector pins P3-V through P3-i and pins P1-V through P1-i, respectively. The external audio signals are accessible at test jacks V-J19 through i-J35.

(4) External Keylines. External keylines conduct ground potential between connector pins P3-q through P3-y and pins P1-q through P1-y, respectively. The keyline signals are accessible at test jacks q-J21 through y-J37.

(5) Subassembly Ground. Ground for the subassemblies in Five Channel Audio Amplifier-Converter, ECI 01-00730-001, is conducted between connector pins P3-X through -j and pins P1-X through -j, respectively. The ground interconnections are available at test jacks X-J22 through j-J38. The chassis ground is connected to test jack HH-J18.

(6) AC Power. The 115 vac power is conducted between connector pins P3-T and P3-S and P1-T and P1-S, and is applied to test jacks T-J16 and S-J17.

(7) Transmitter Audio. The transmitter audio lines conduct radio 1-5 xmtr audio signals between connector pins P4-A through P4-U and P2-A and P2-U, respectively. The xmtr audio signals are accessible at test jacks A-J39 through U-J48.

(8) Receiver Audio. The receiver audio lines conduct radio 1-5 rcvr audio signals between connector pins P4-X through P4-i and pins P2-X through P2-i. The rcvr audio signals are accessible at test jacks X-J49 through i-J58.

(9) DC Power. The +28 vdc power is conducted between connector pins P4-C and P4-D and P2-C and P2-D, and is applied to test jacks C-J59 and D-J60.

b. TEST DATA. If it has been determined that the circuits of Test Adapter, MX-8158/TYA-11 are defective, visually inspect the wiring and perform continuity checks using Multimeter, AN/PSM-4. See Figure 5-10 for parts location.

4-5. SERVICING BLOCK DIAGRAMS. This information explains the arrangement of the servicing block diagrams. The servicing block diagrams (Figures 4-9 through 4-28) are arranged so the overall block diagrams are followed by the servicing block diagrams included in this section. The servicing block diagrams include all circuits as applicable. Each functional section or functional circuit group is enclosed by phantom lines. The descriptive name of each functional section or circuit group is placed inside of the enclosed area. Main signal paths are represented by heavy lines with arrowheads

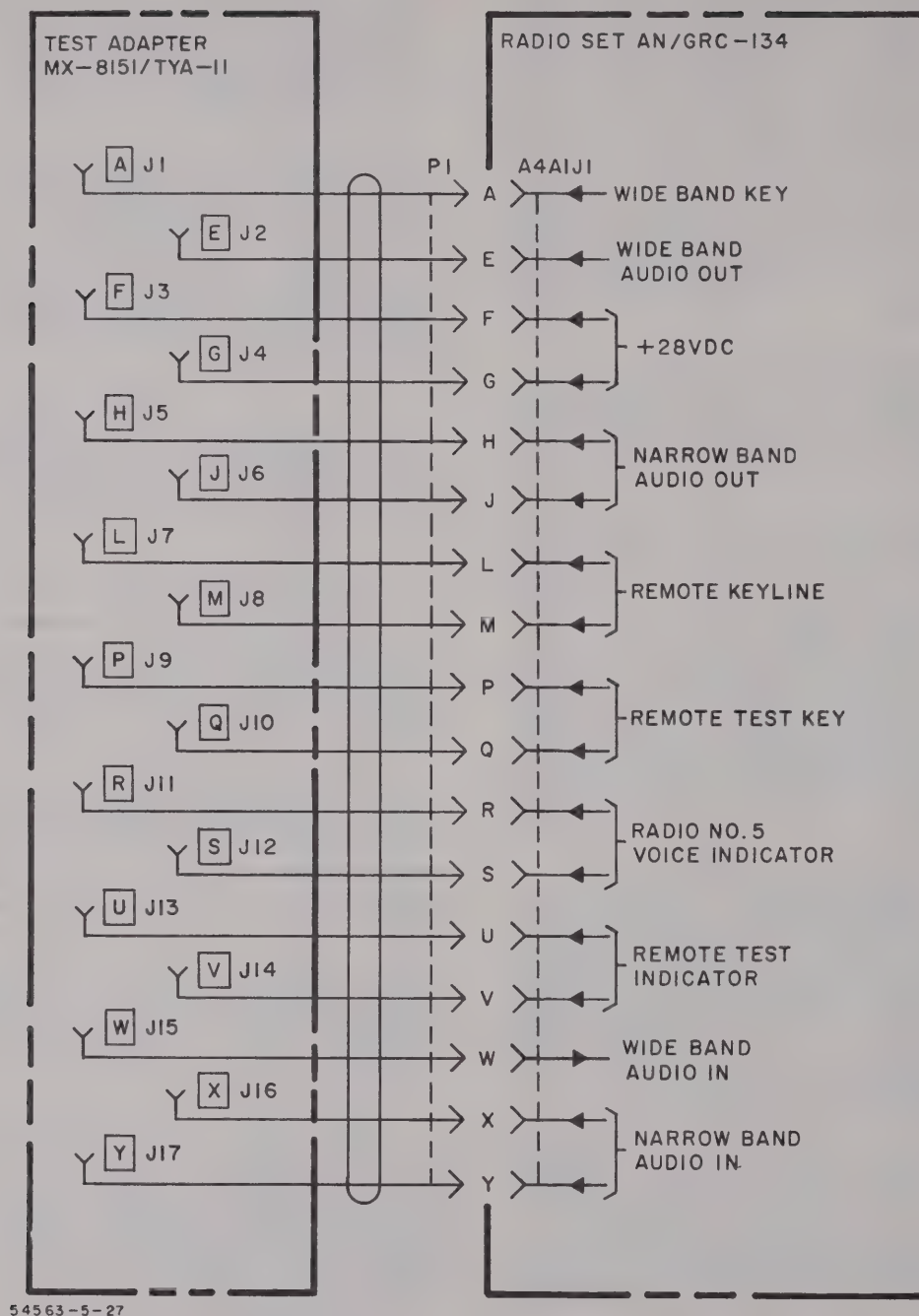
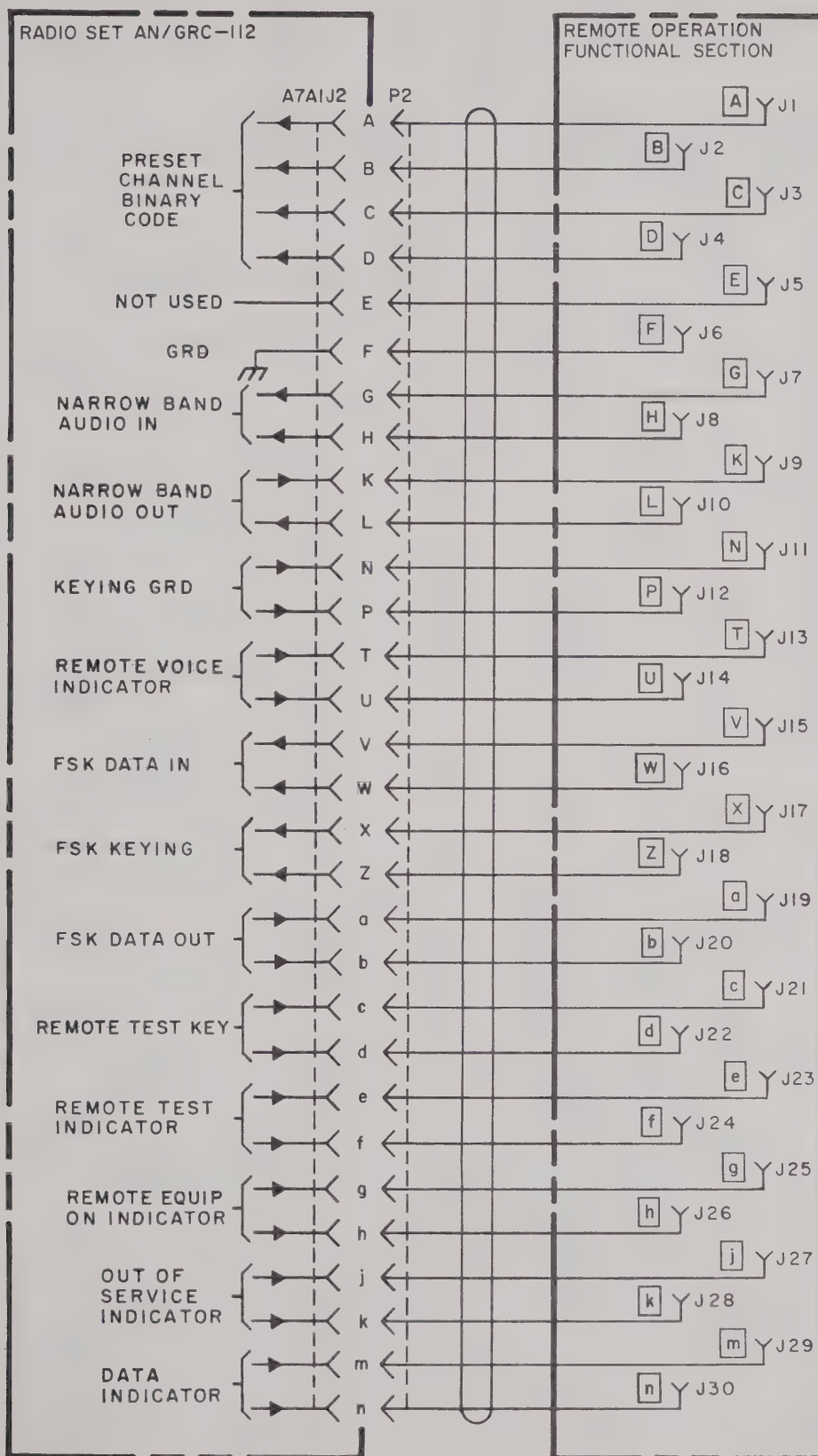


Figure 4-9. Test Adapter, MX-8151/TYA-11, Servicing Block Diagram

to show direction of signal flow. The signal data progress from left to right and from top to bottom whenever possible. The inputs enter at the left or top, and outputs leave at the right of servicing block diagrams. Semiconductors are shown as separate blocks, except identical circuits or a dual section circuit stage. The semiconductor block diagram contains the functional

name and reference designation. Switch contacts, relay contacts, potentiometers, tuning capacitors, terminal strips, jacks and plugs, test points and coaxial connectors are drawn schematically when required for clarity. Operating and adjustment controls are indicated by a dotted line extending from the control or circuit to a small circle.



54563-5-24

Figure 4-10. Remote Operation Functional Section, Servicing Block Diagram

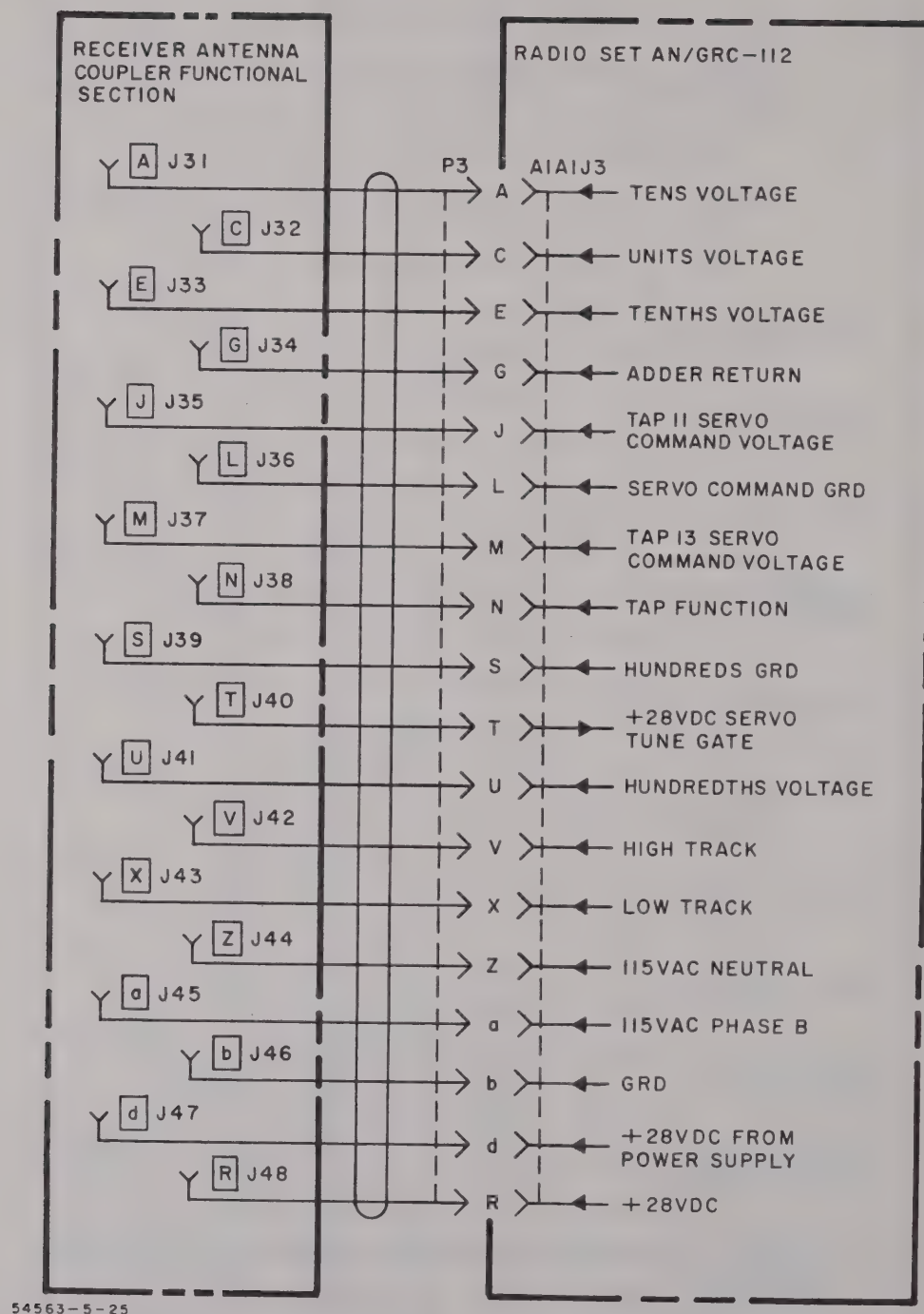


Figure 4-11. Receive Antenna Coupler, Functional Section, Servicing Block Diagram

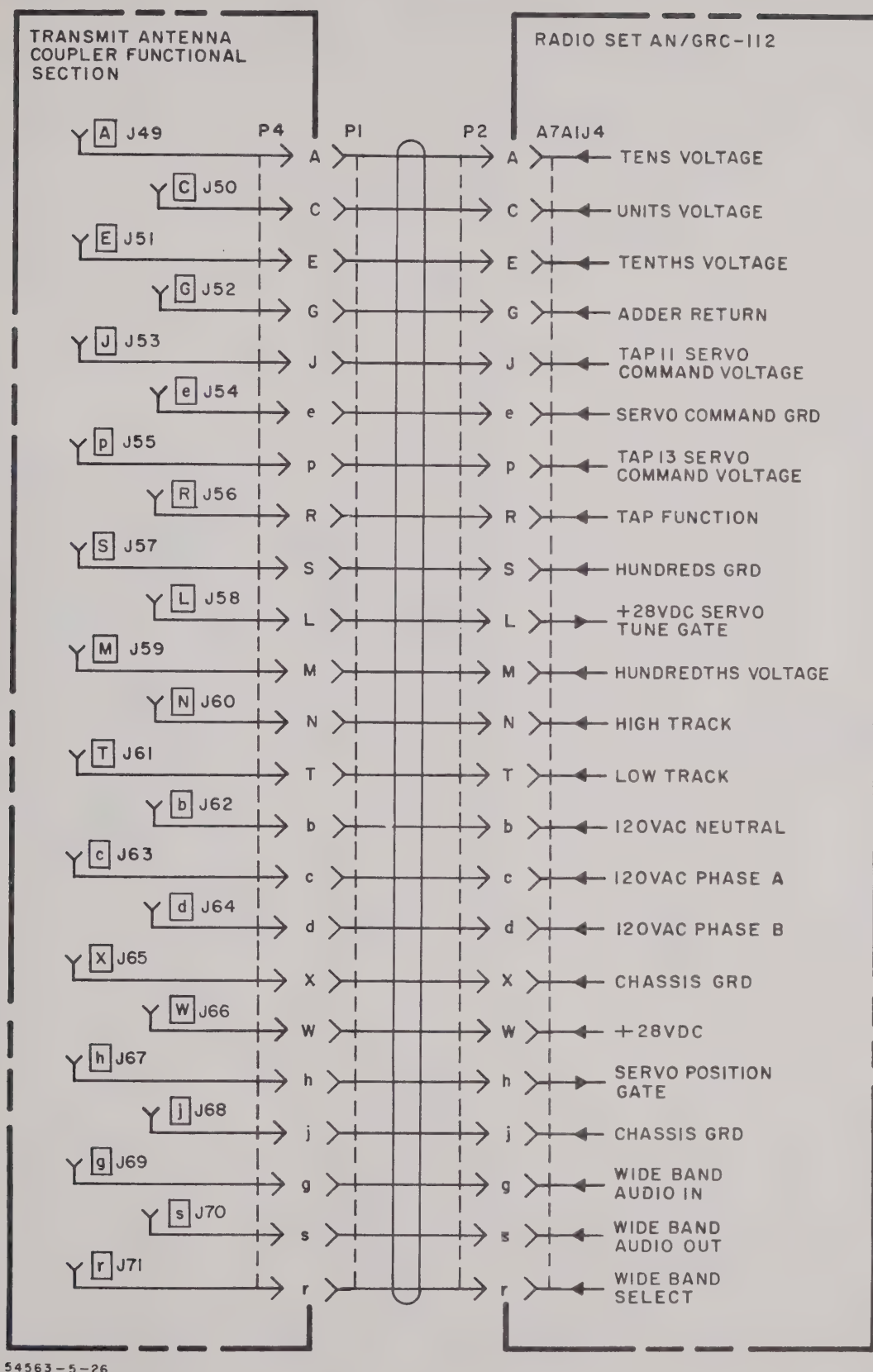


Figure 4-12. Transmit Antenna Coupler Functional Section, Servicing Block Diagram

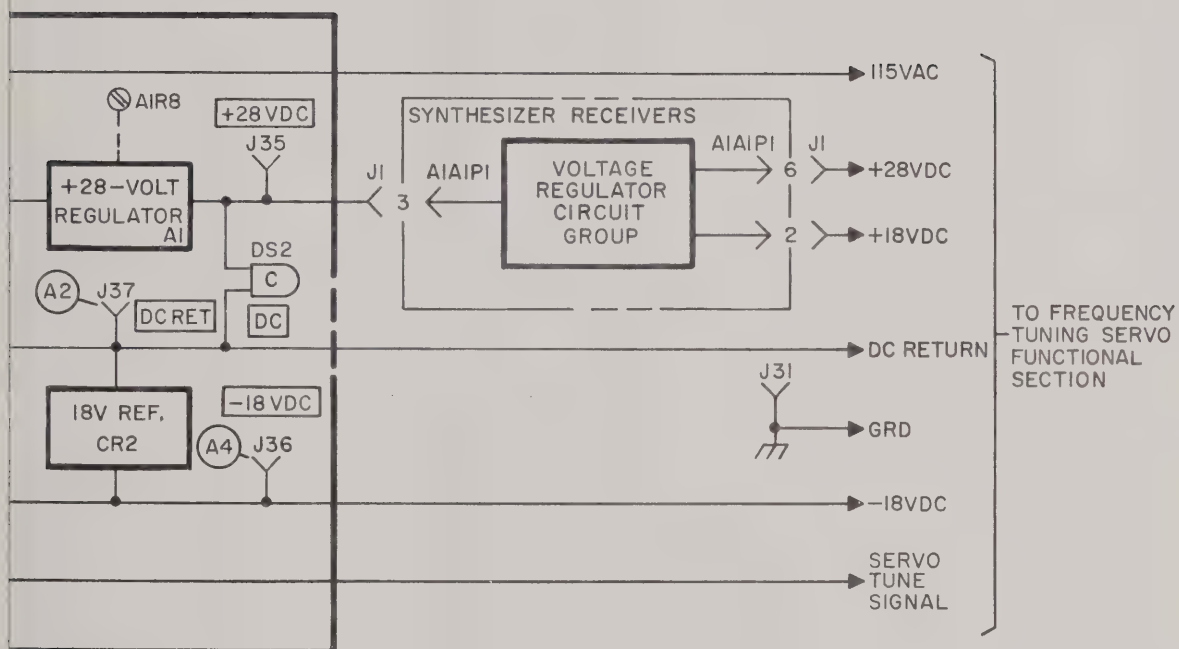


Figure 4-13. Test Set Coupler, MX-8153/TYA-11, Power Supply Functional Section, Servicing Block Diagram

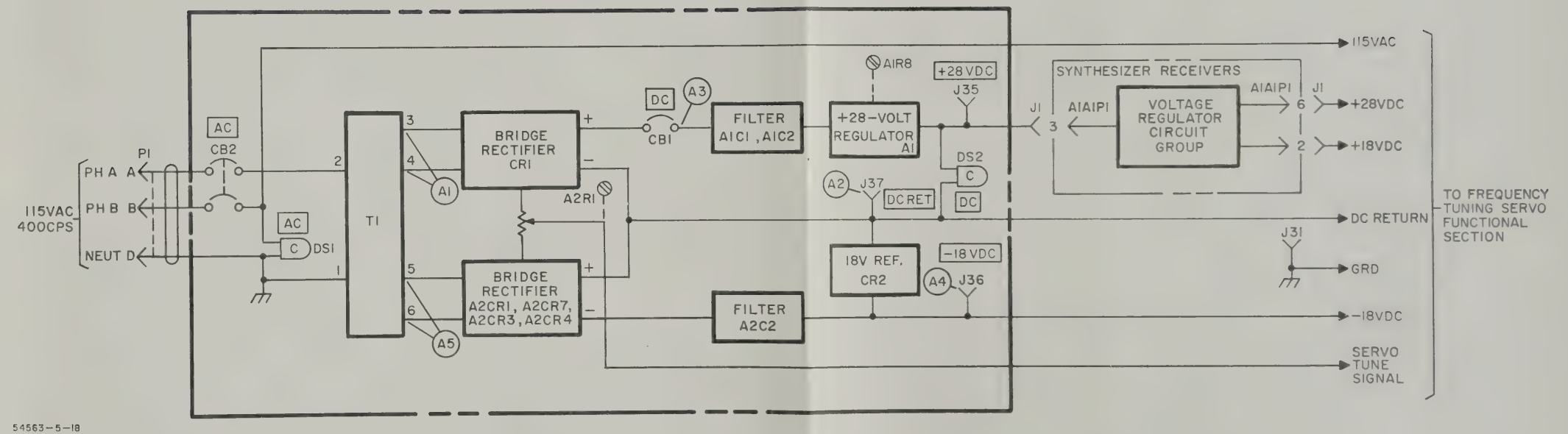


Figure 4-13. Test Set Coupler, MX-8153/TYA-11, Power Supply Functional Section, Servicing Block Diagram

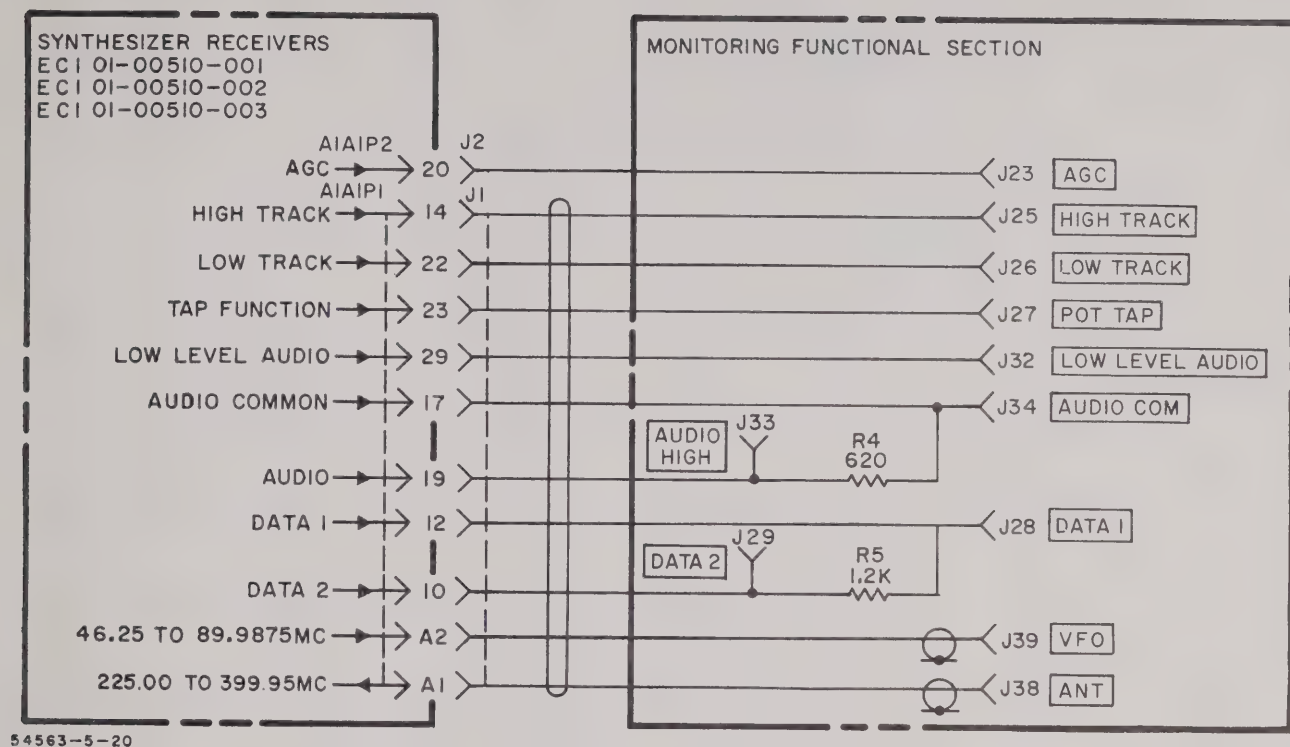
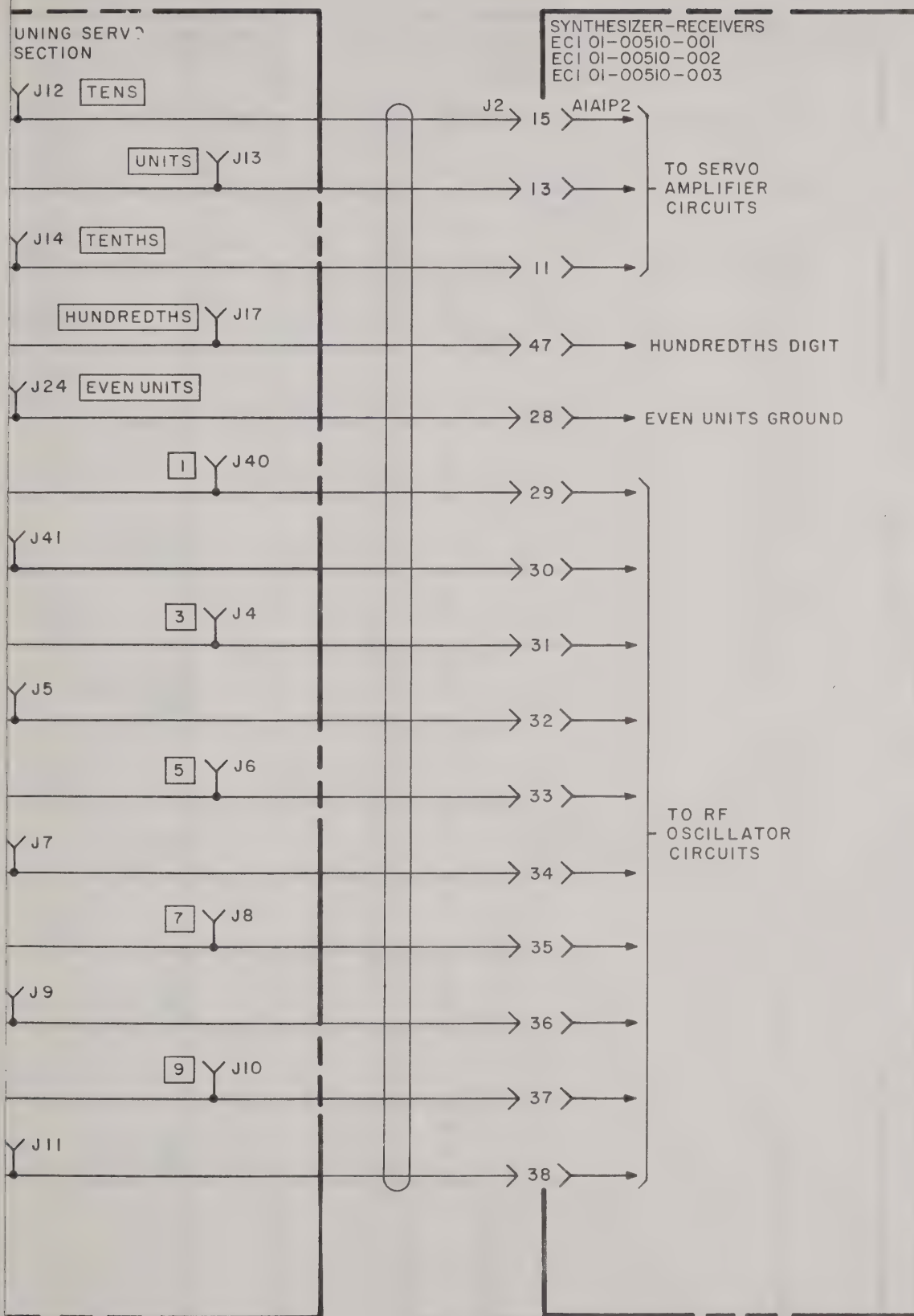
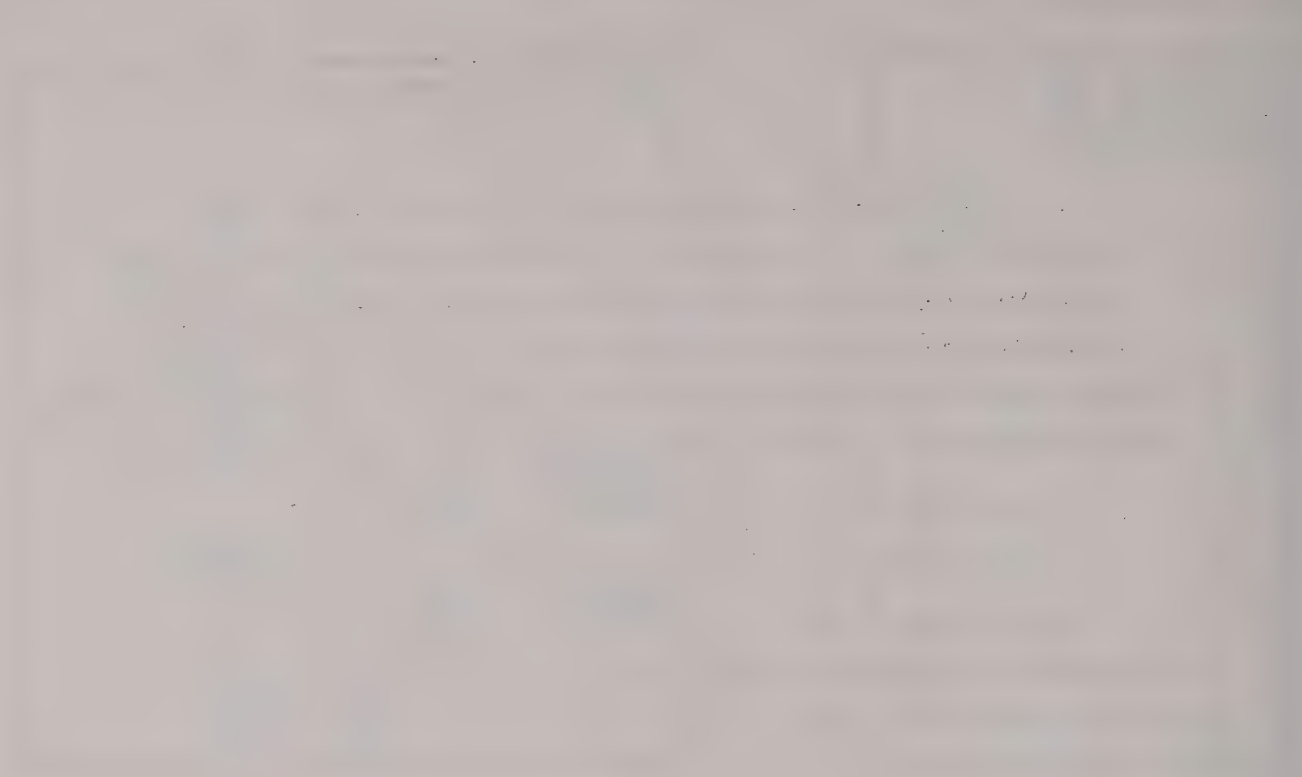
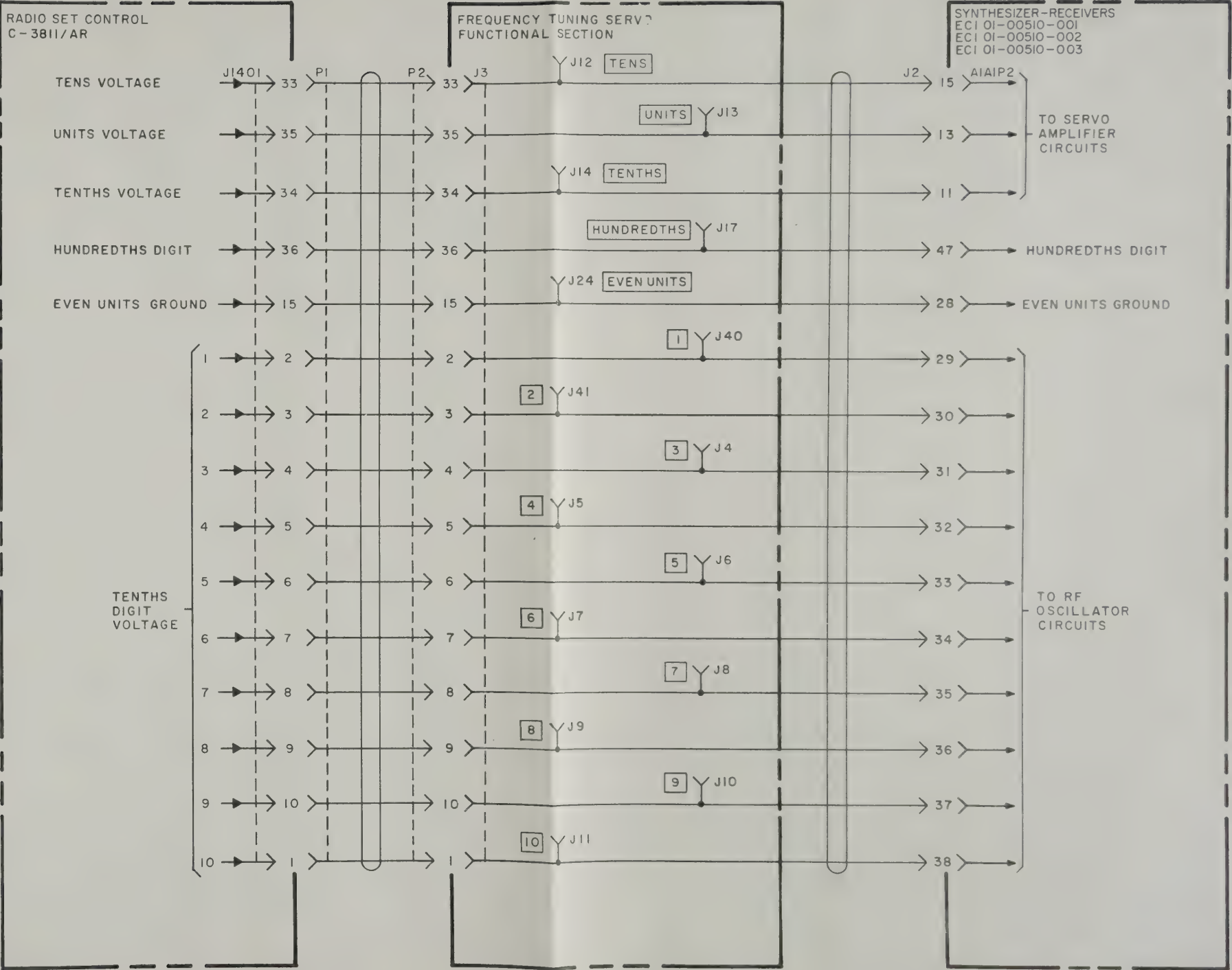


Figure 4-14. Monitoring Functional Section, Servicing Block Diagram



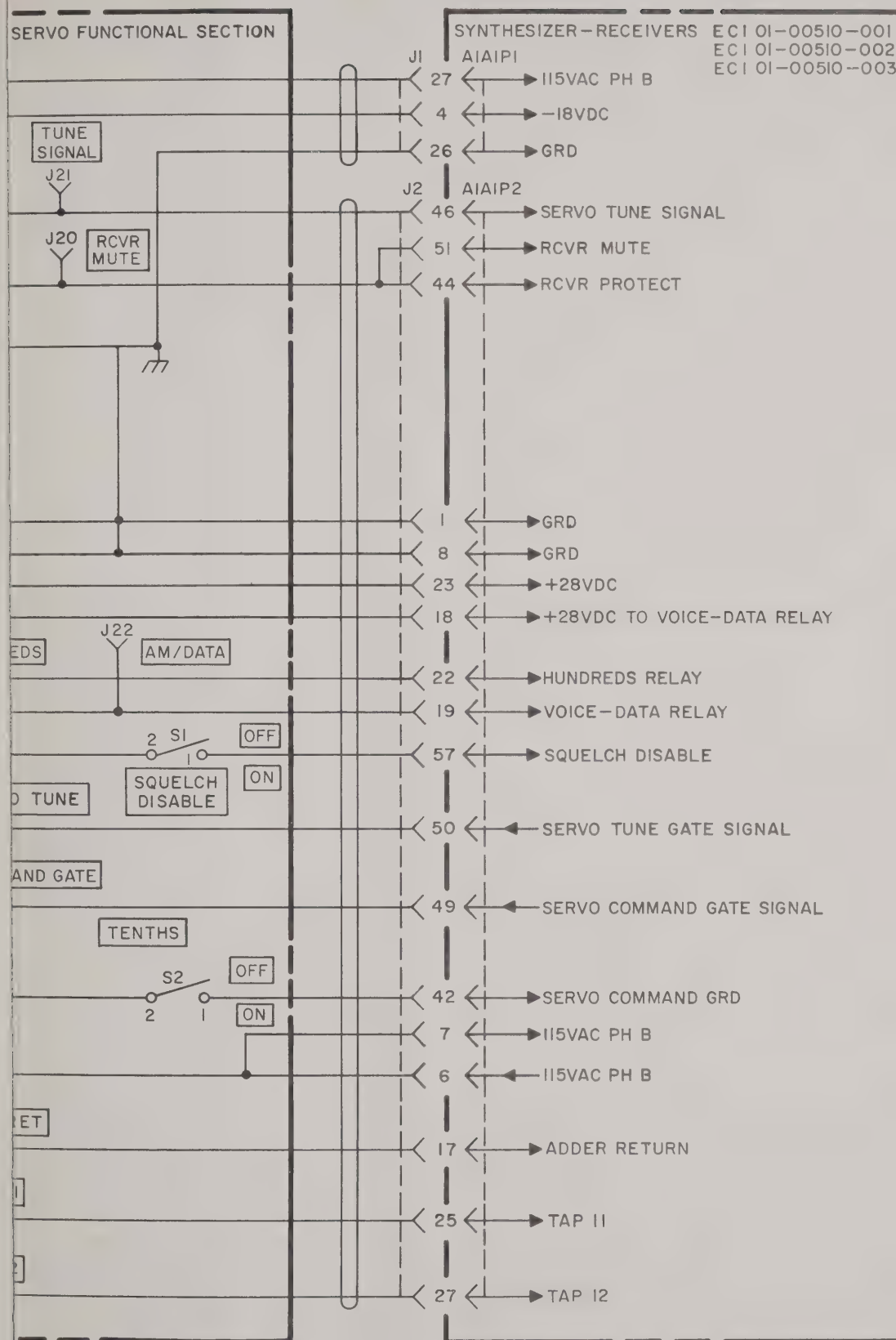




54563-5-22 (SHEET 1 OF 2)

Figure 4-15. Frequency Tuning Servo Functional Section, Servicing Block Diagram (Sheet 1 of 2)

ORIGINAL



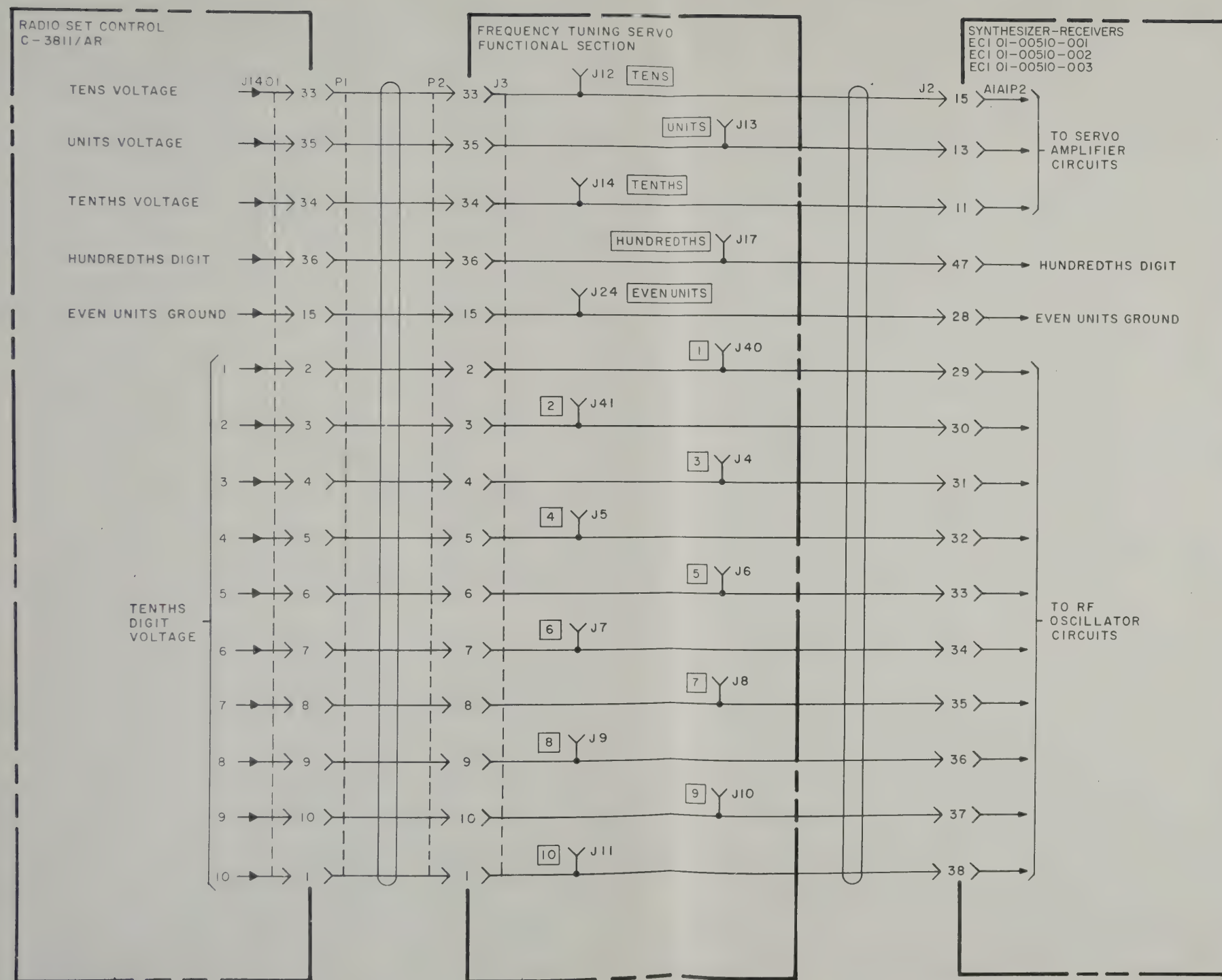
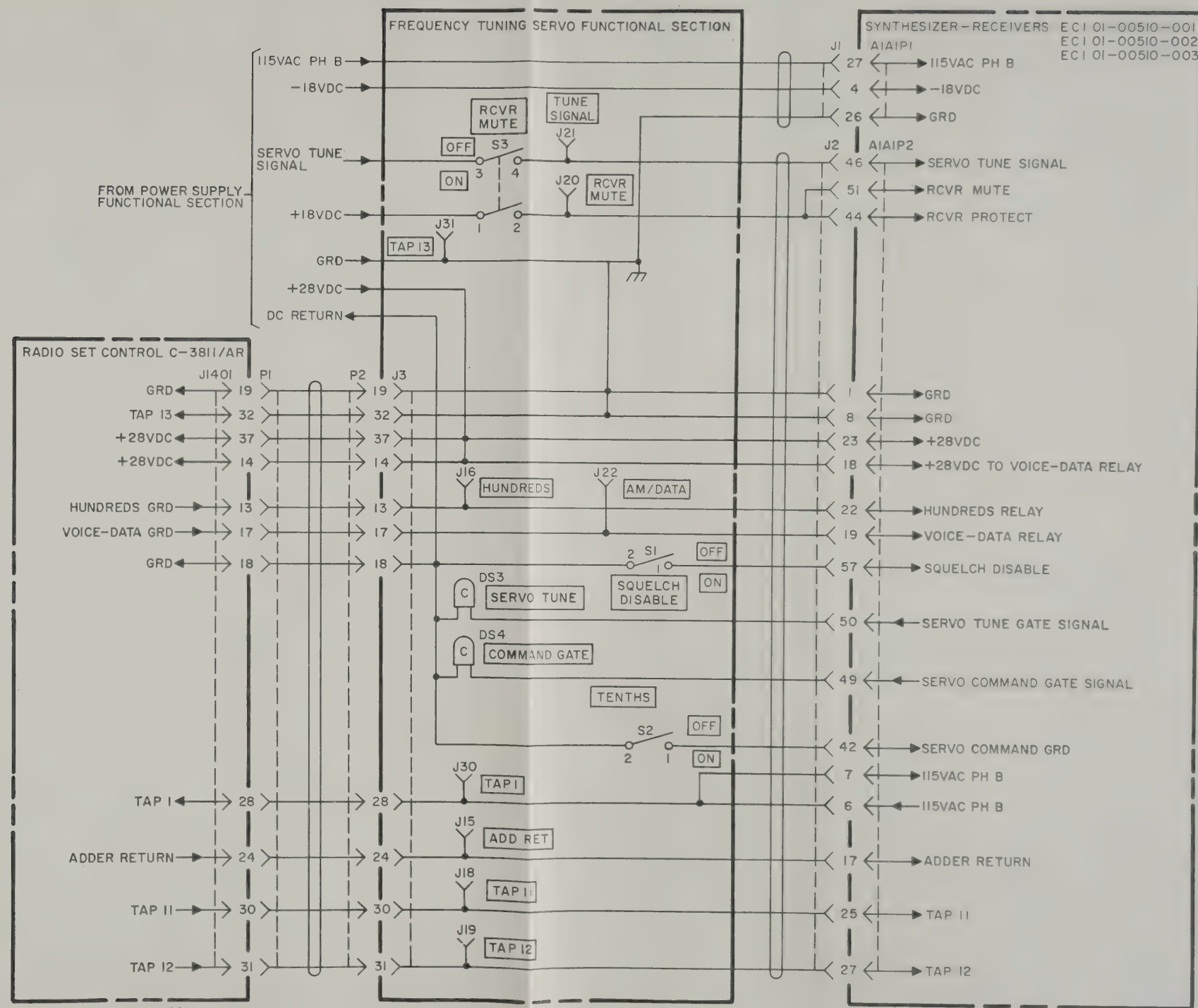


Figure 4-15. Frequency Tuning Servo Functional Section, Servicing Block Diagram (Sheet 1 of 2)

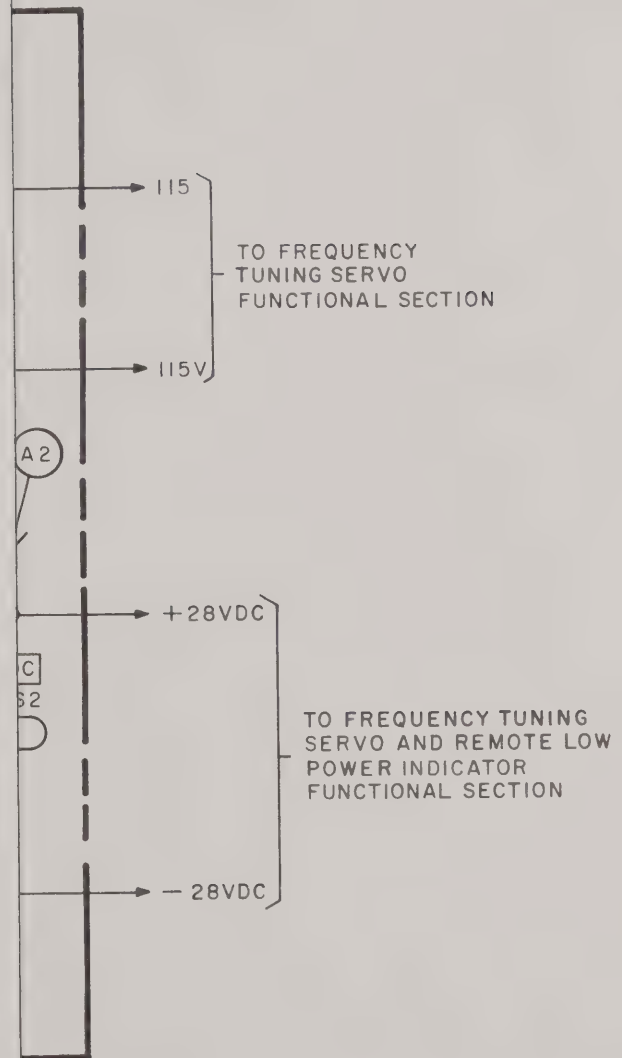


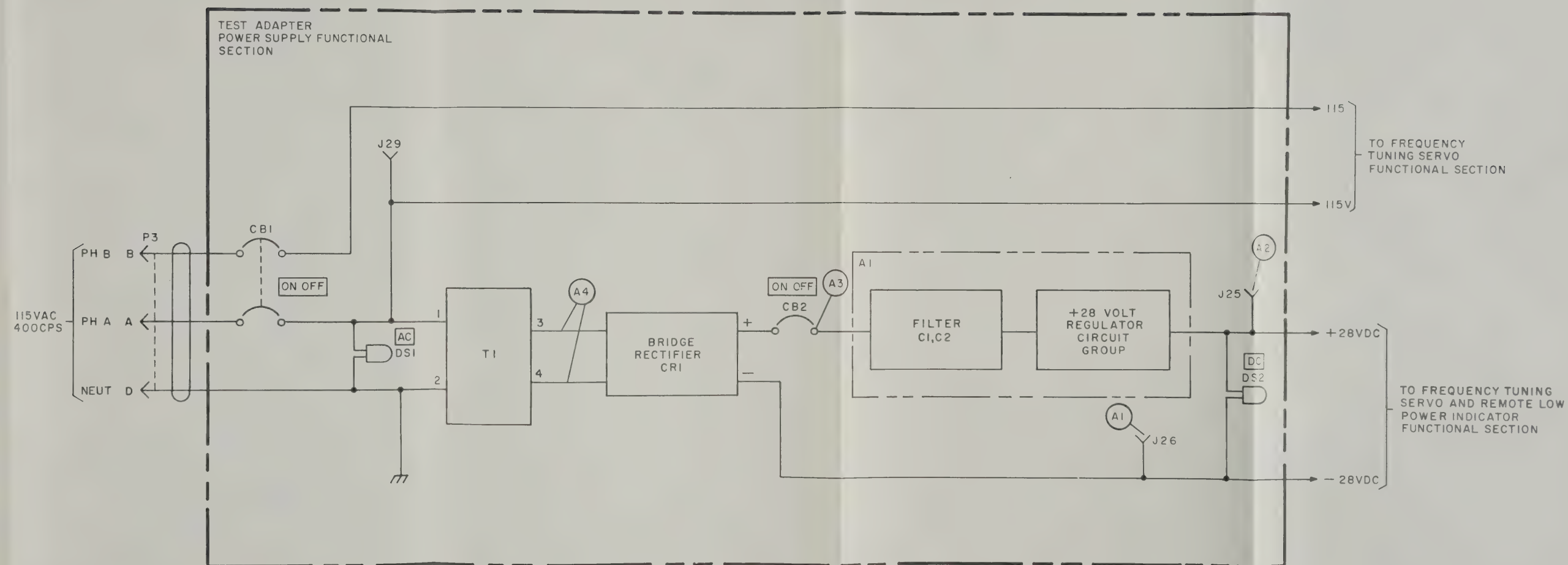
54563-5-21 (SHEET 2 OF 2)

Figure 4-15. Frequency Tuning Servo Functional Section, Servicing Block Diagram (Sheet 2 of 2)

ORIGINAL

4-41, 4-42





54563 5-14

Figure 4-16. Test Adapter Power Supply Functional Section, Servicing Block Diagram

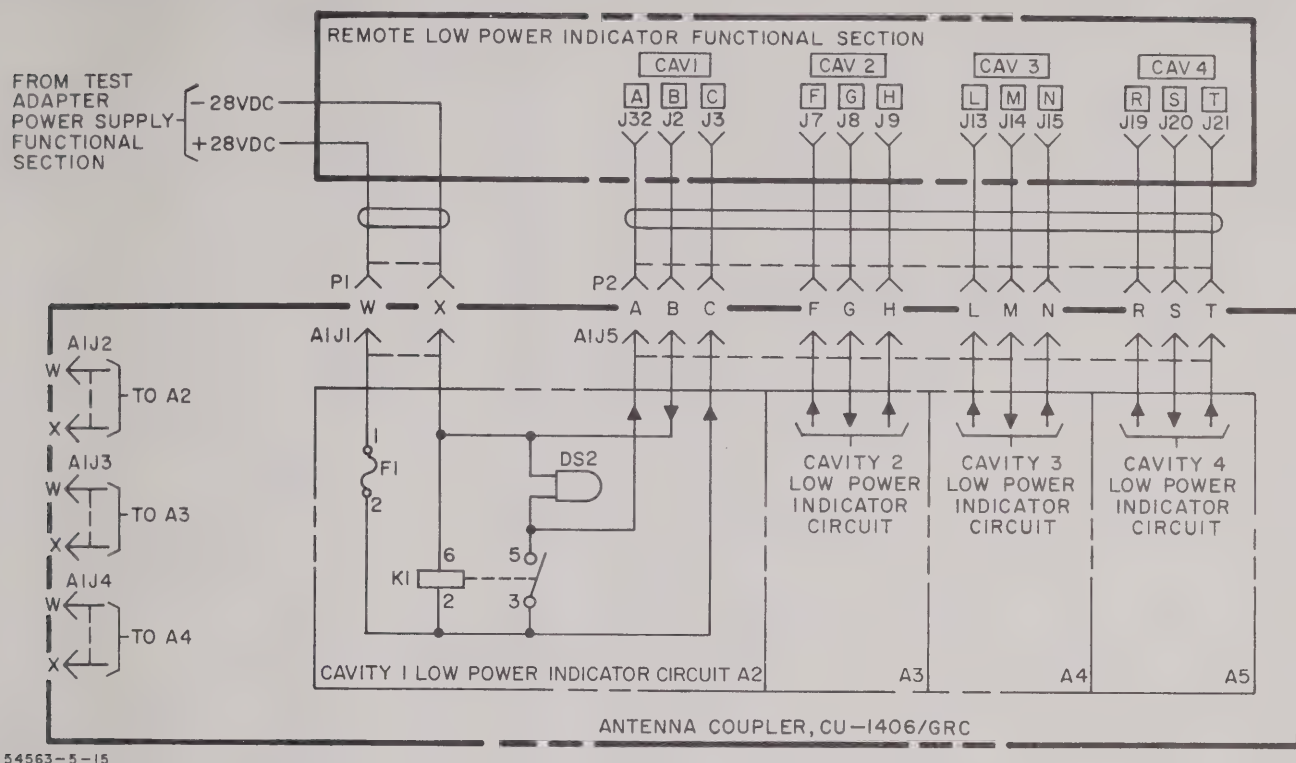
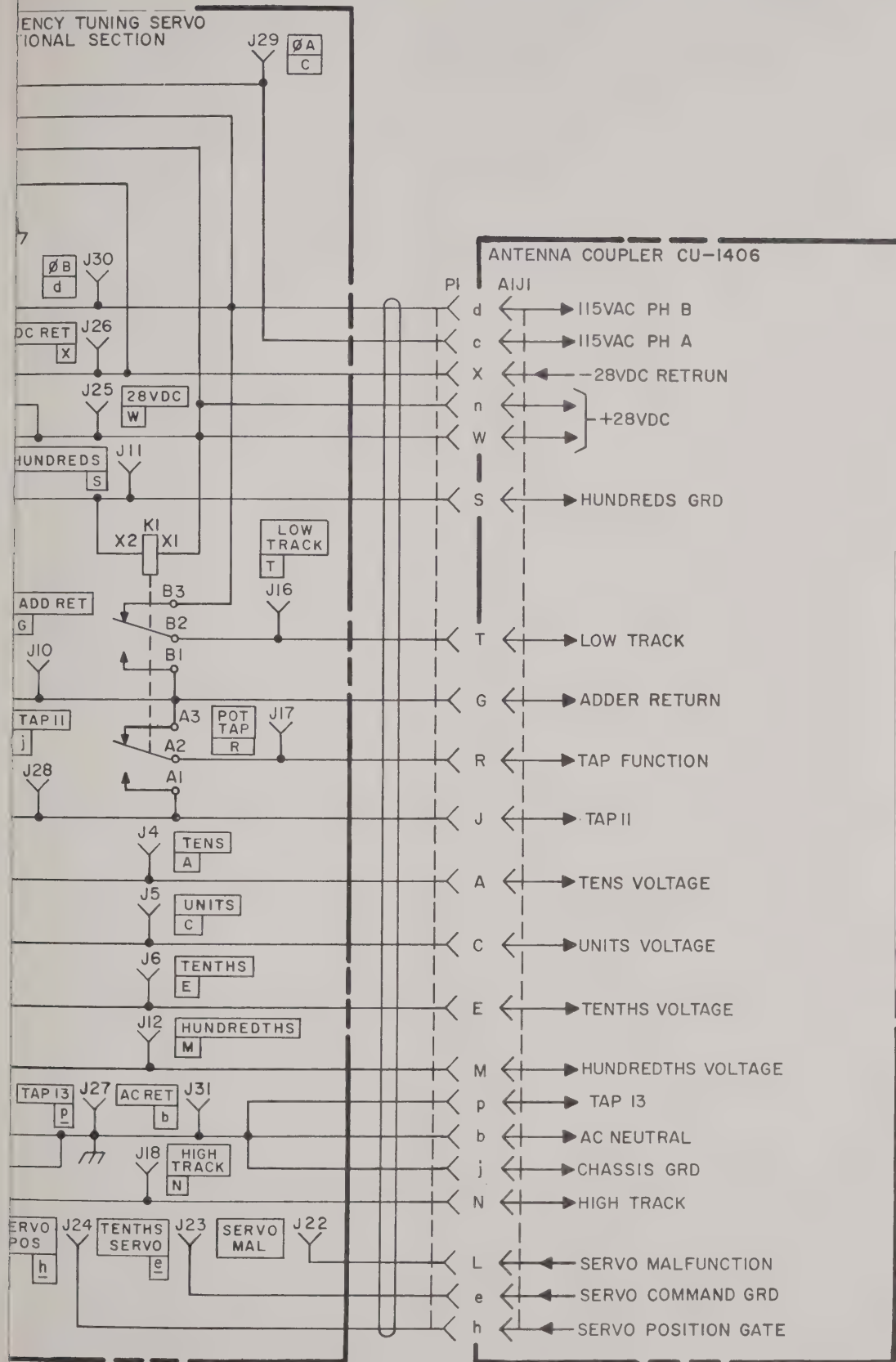
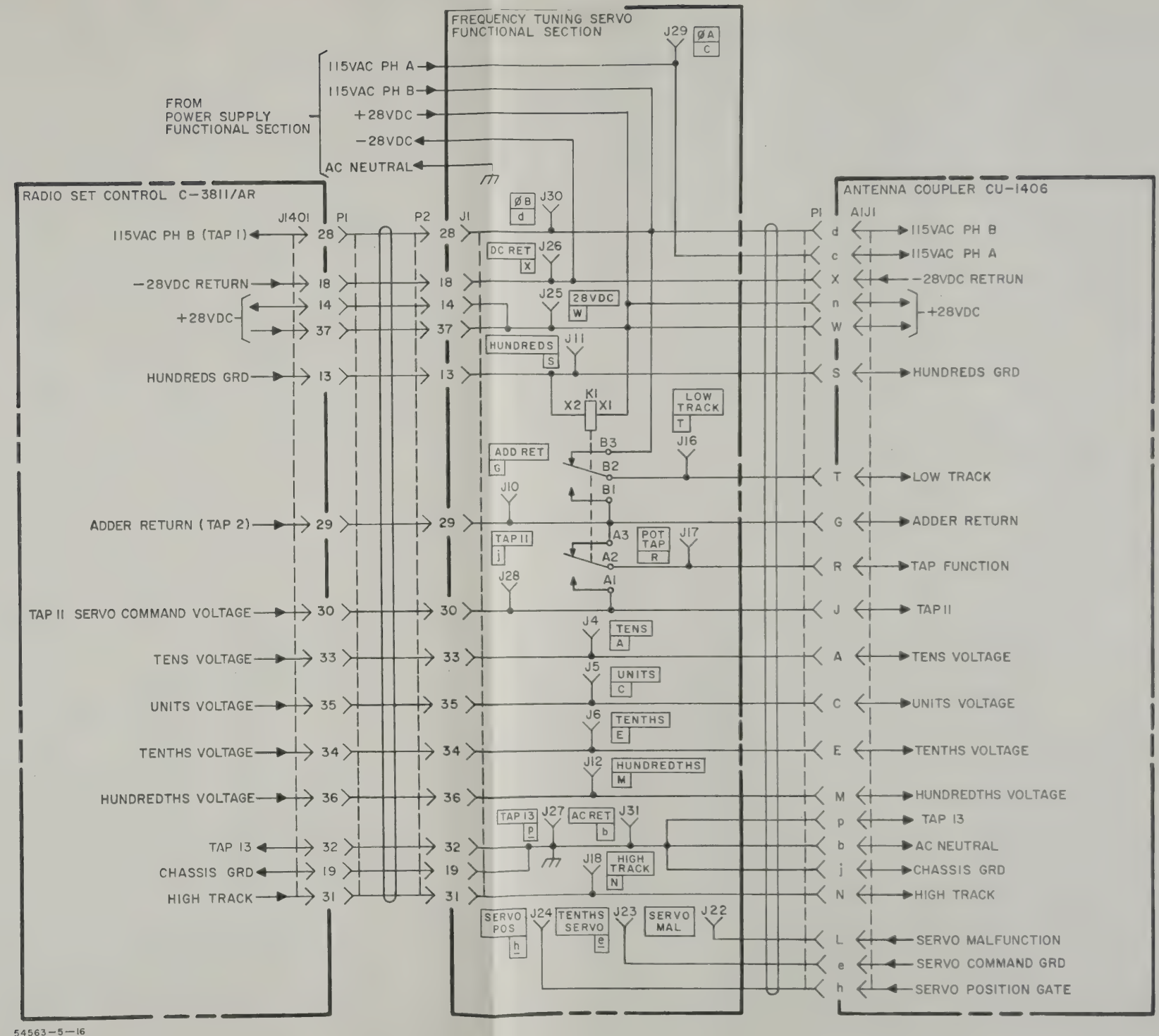


Figure 4-17. Remote Low Power Indicator Functional Section, Servicing Block Diagram

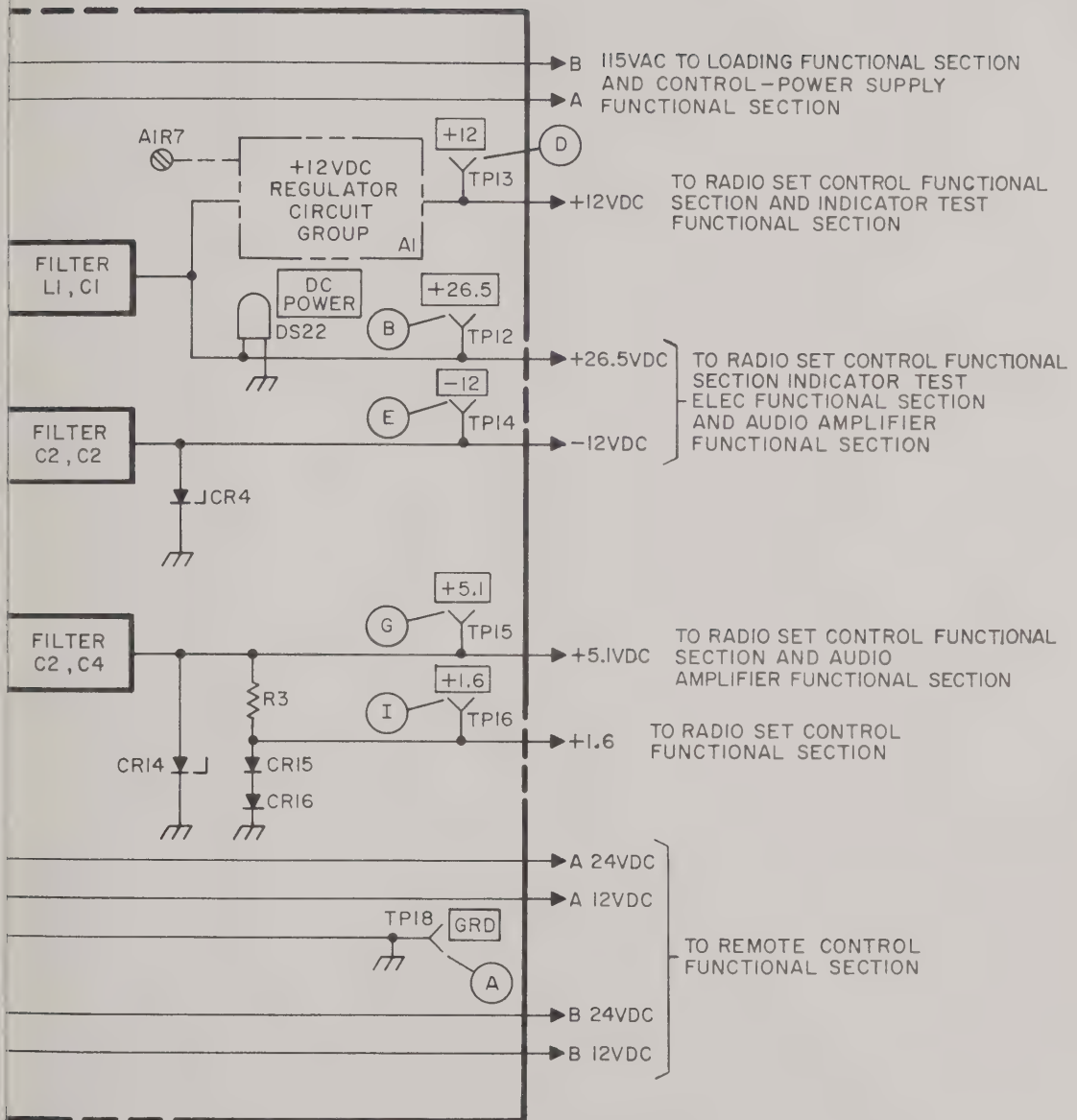


-18. Frequency Tuning Servo Functional Section, Servicing Block Diagram



54563-5-16

Figure 4-18. Frequency Tuning Servo Functional Section, Servicing Block Diagram



Control Group Test Set Power Supply Functional Section, Servicing Block Diagram

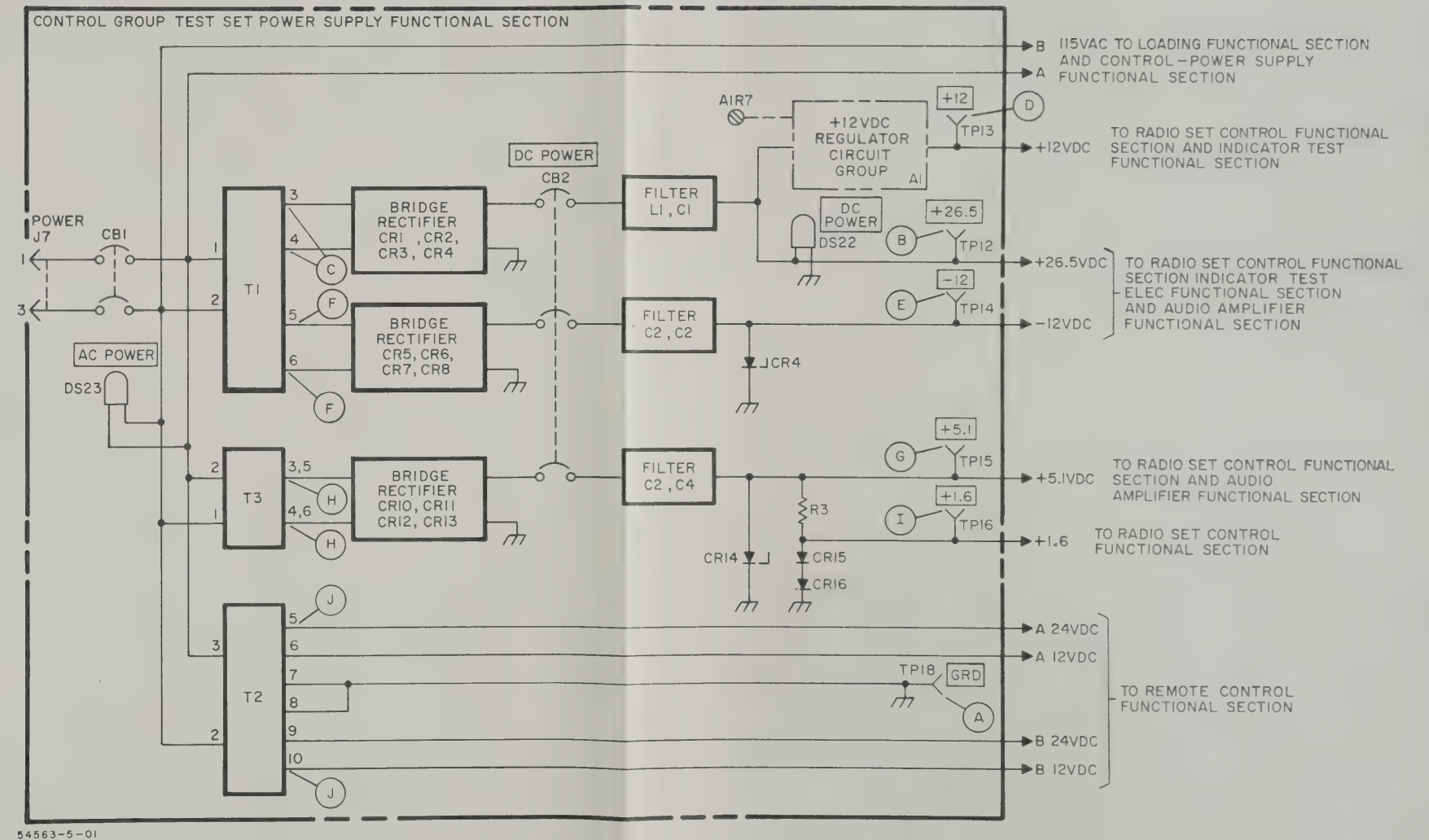


Figure 4-19. Control Group Test Set Power Supply Functional Section, Servicing Block Diagram

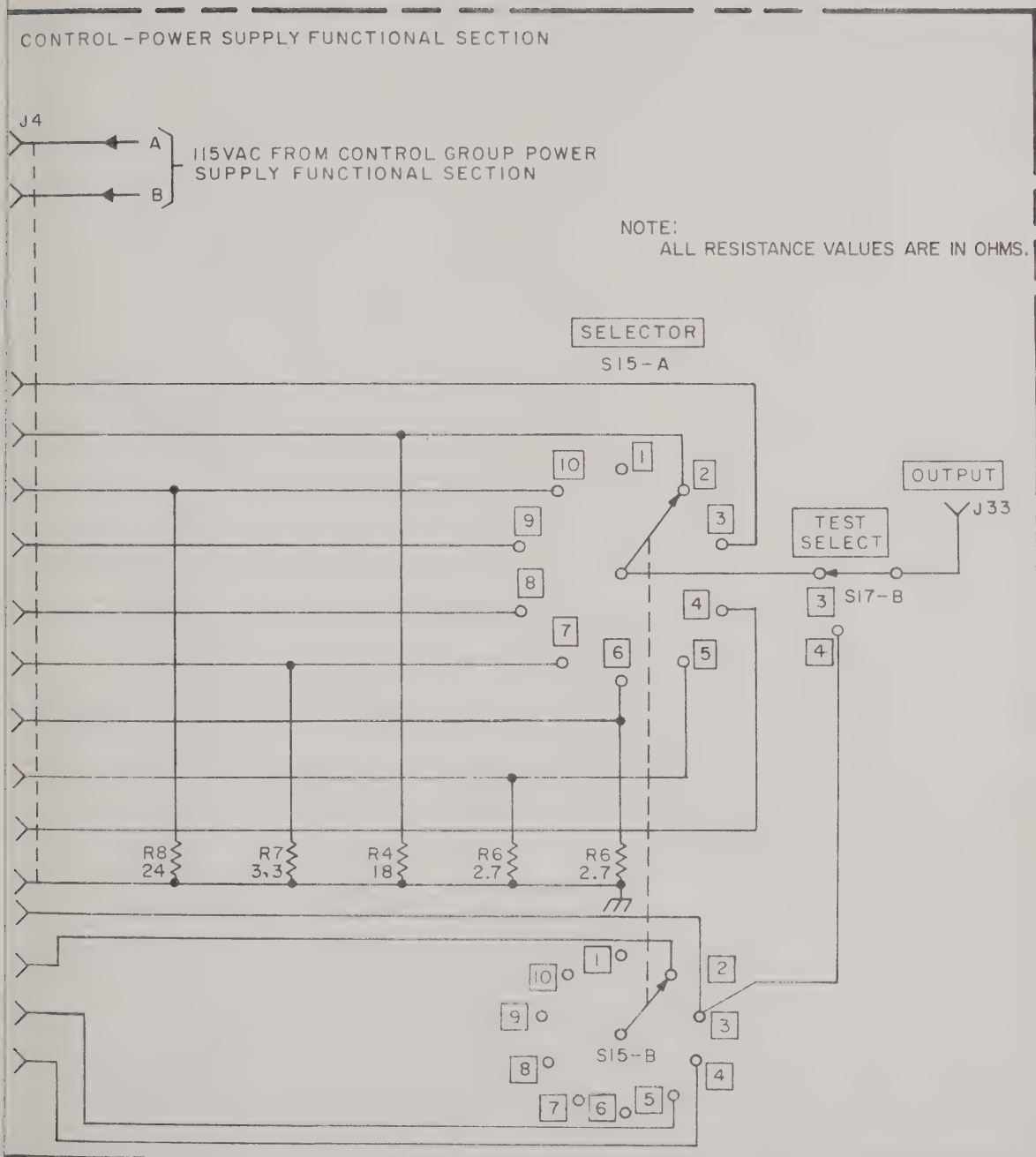


Figure 4-20. Control-Power Supply Functional Section, Servicing Block Diagram

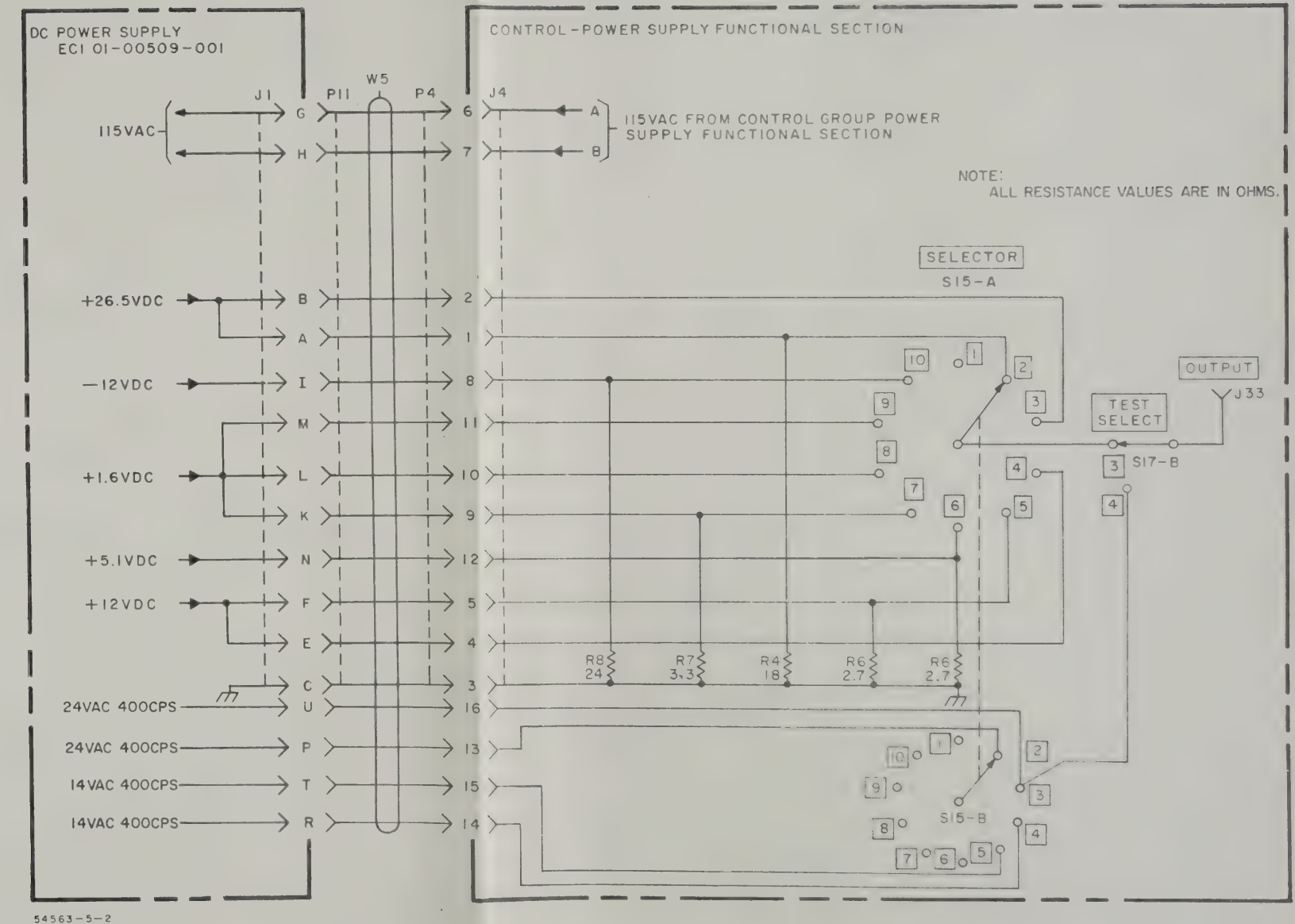


Figure 4-20. Control-Power Supply Functional Section, Servicing Block Diagram

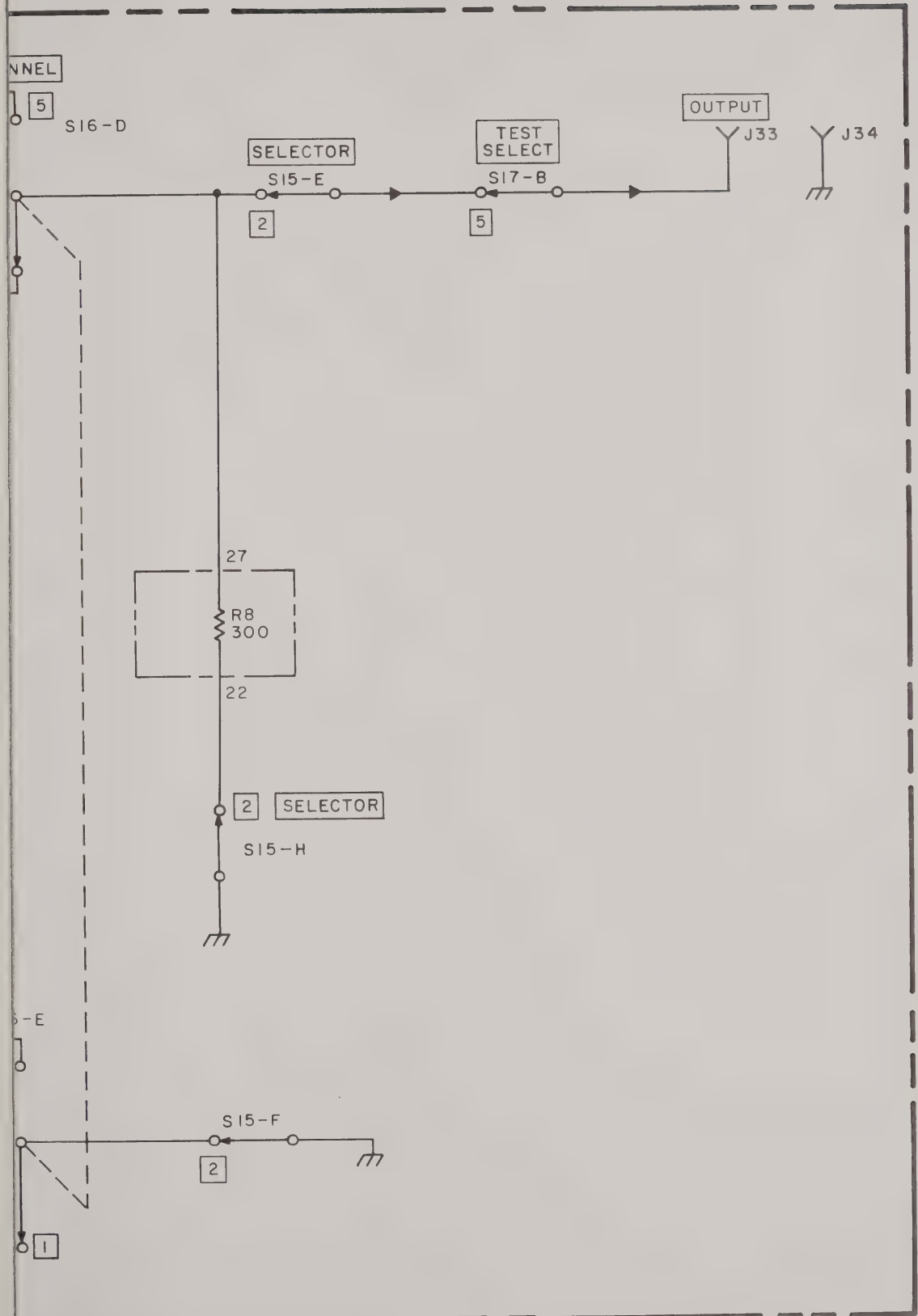


Figure 4-21. Receiver Audio Functional Section, Servicing Block Diagram

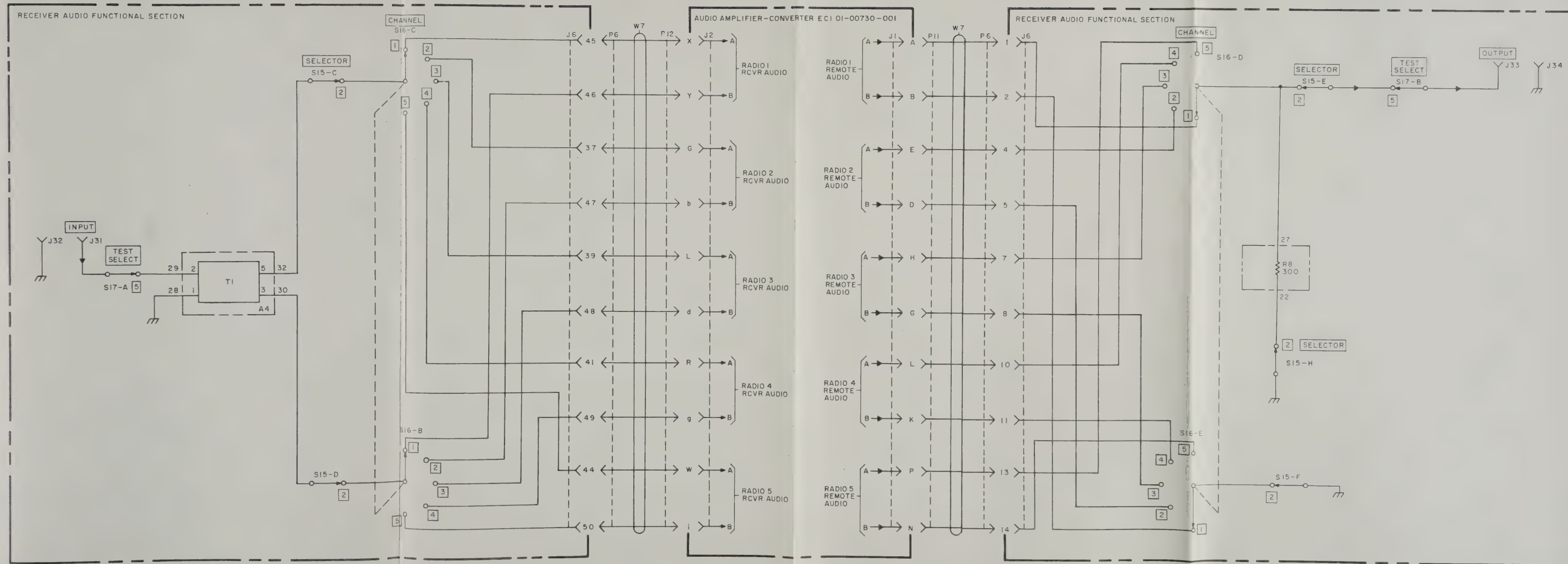
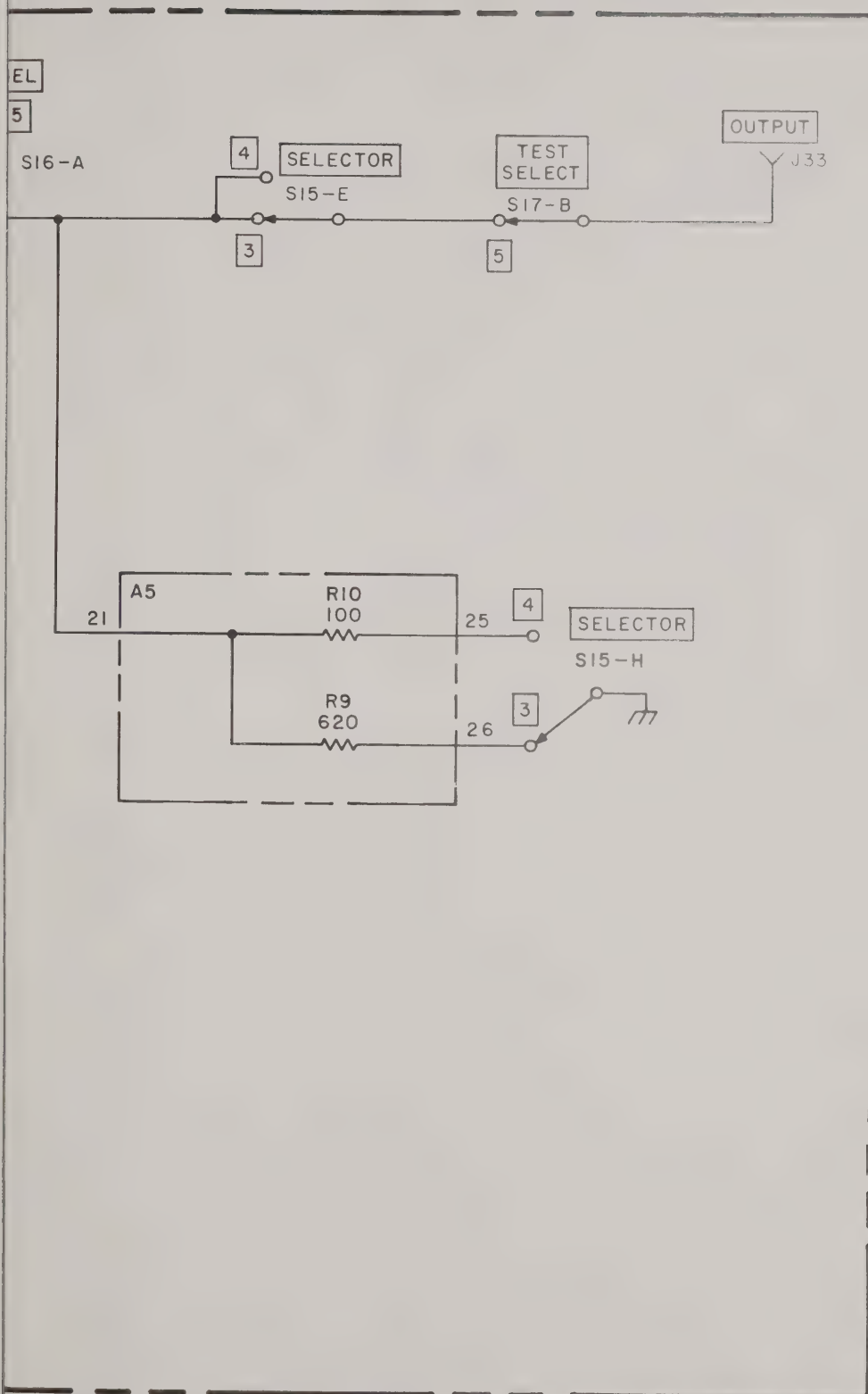


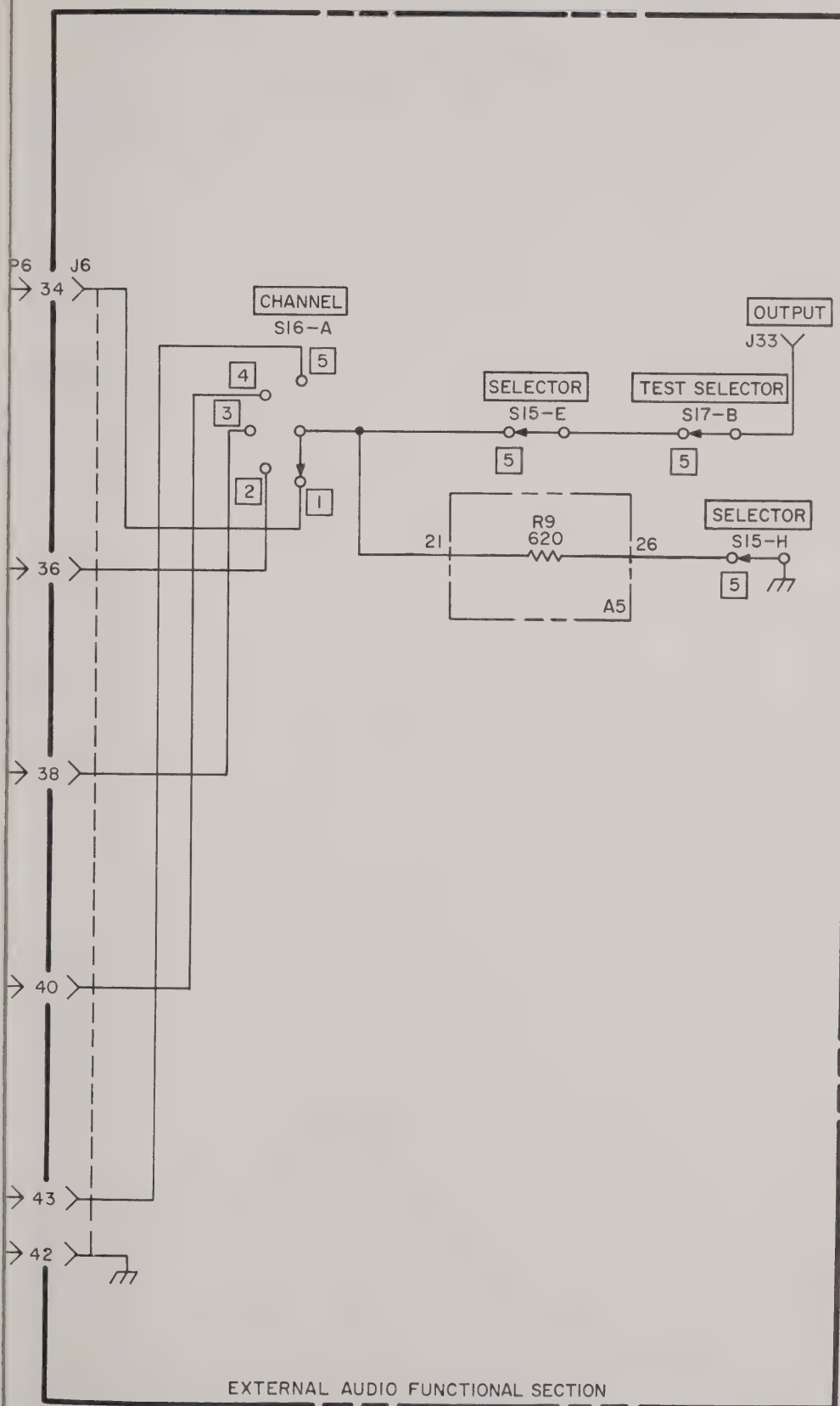
Figure 4-21. Receiver Audio Functional Section, Servicing Block Diagram



Remote Audio Functional Section, Servicing Block Diagram



ORIGINAL



External Audio Functional Section, Servicing Block Diagram

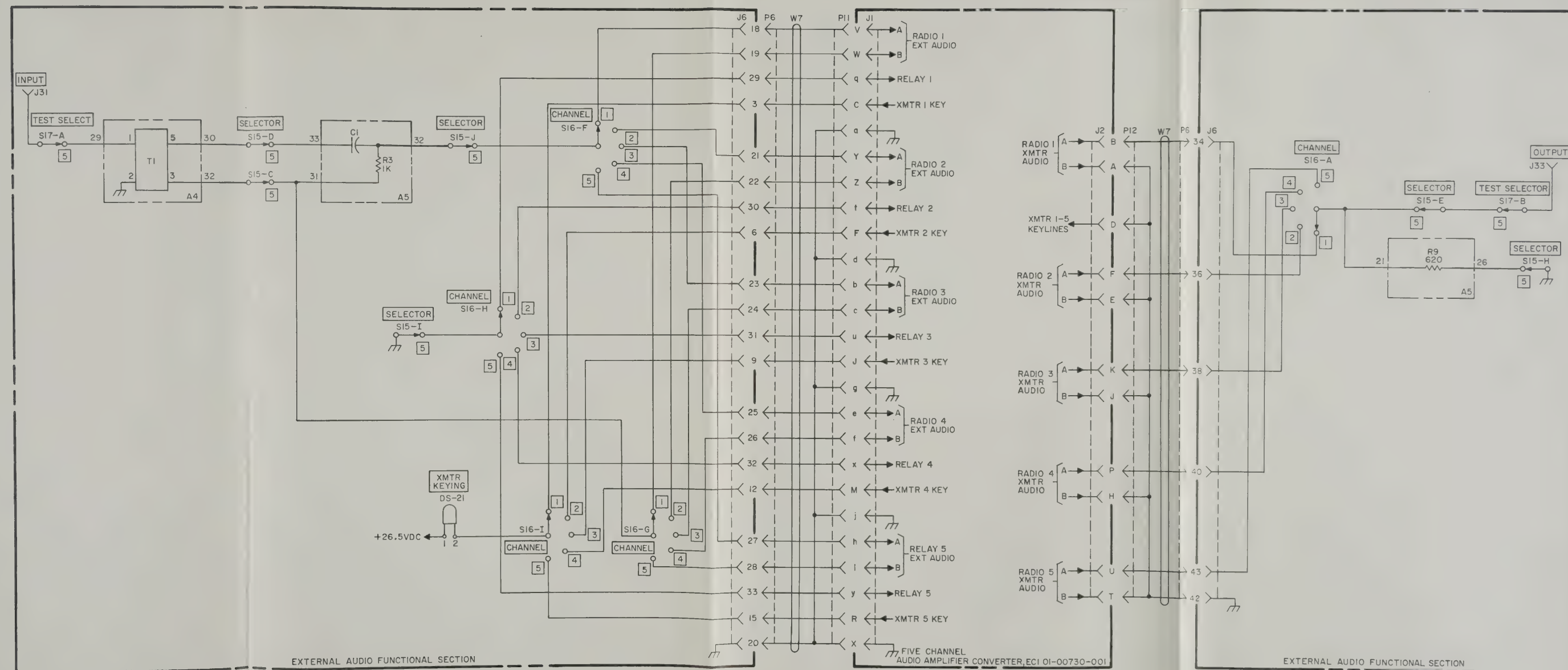


Figure 4-23. External Audio Functional Section, Servicing Block Diagram

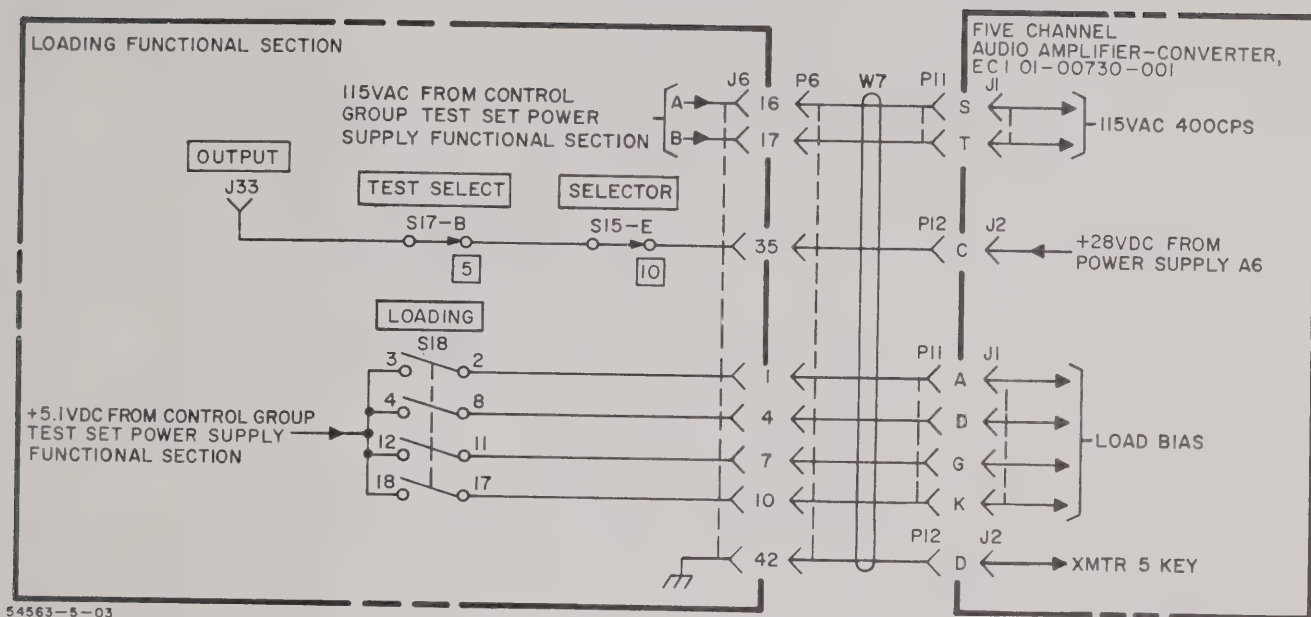
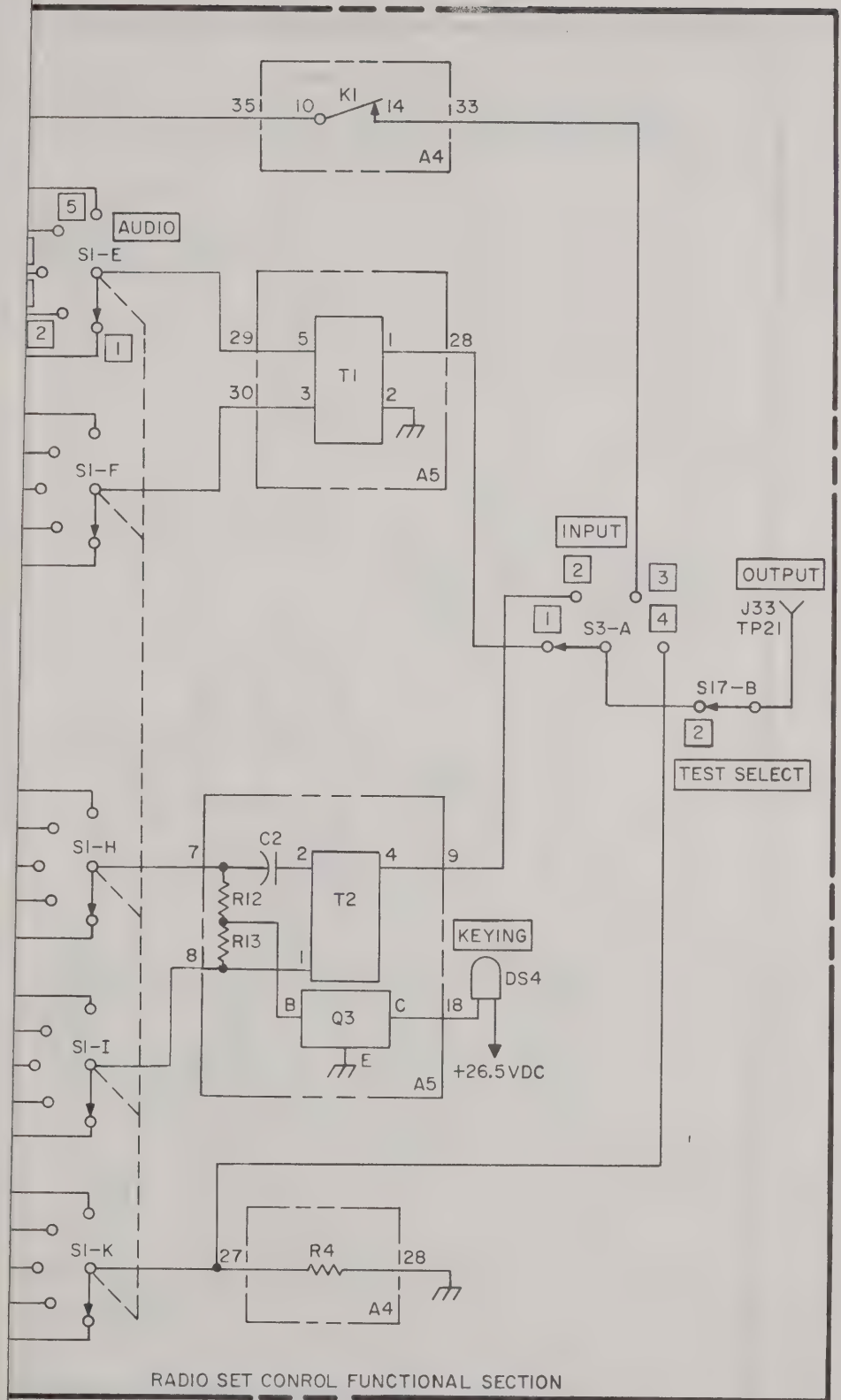


Figure 4-24. Loading Functional Section, Servicing Block Diagram



Control Functional Section, Servicing Block Diagram (Sheet 1 of 2)

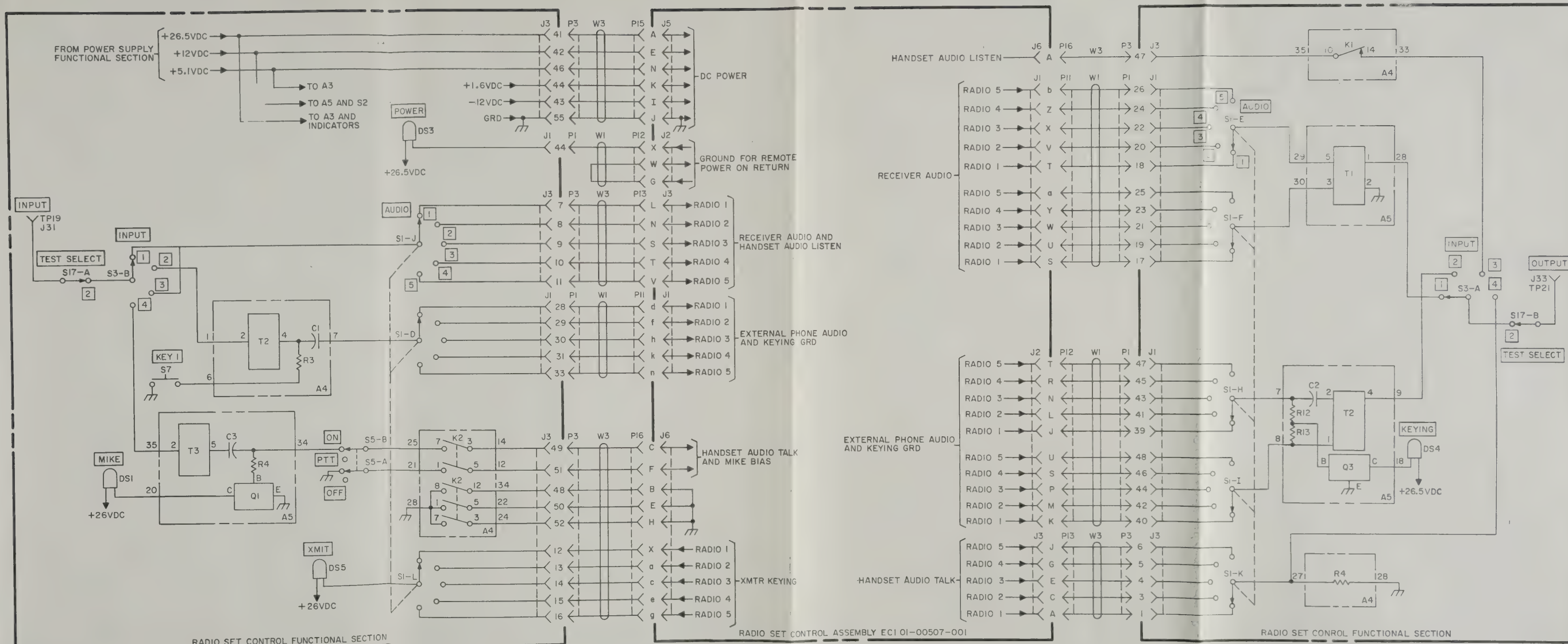
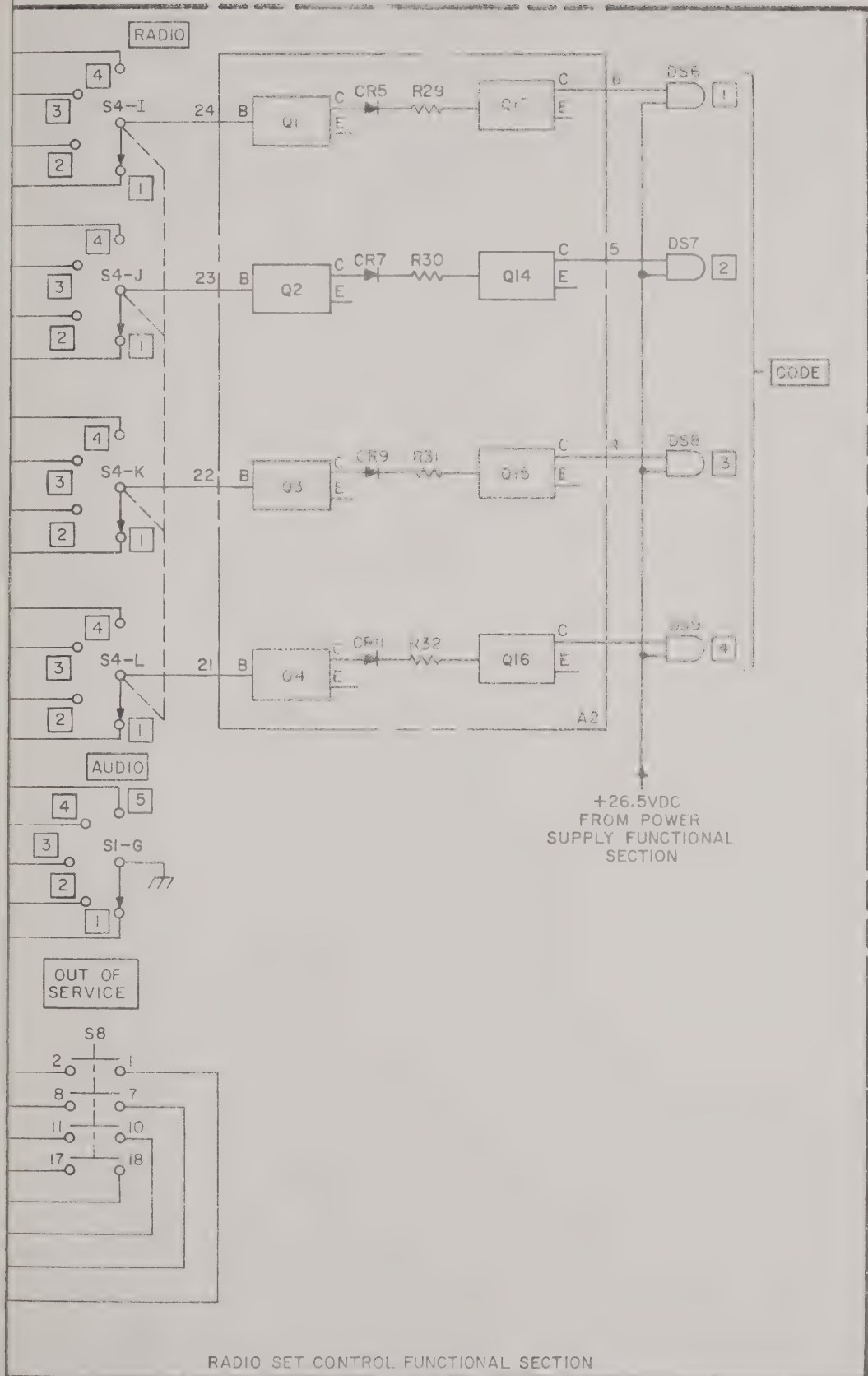


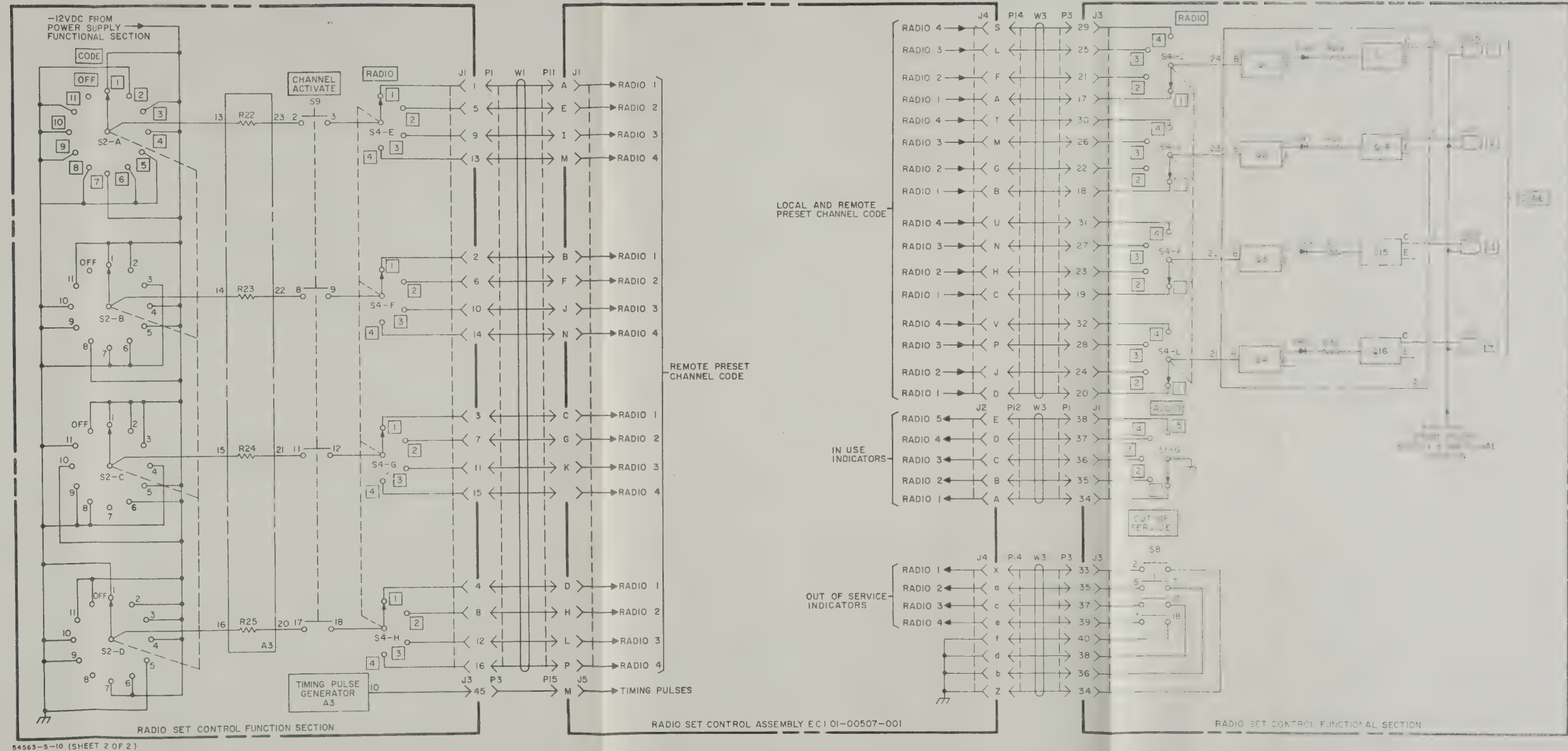
Figure 4-25. Radio Set Control Functional Section, Servicing Block Diagram (Sheet 1 of 2)

Figure 4-25. Radio Set Control Functional Section, Servicing Block Diagram (Sheet 1 of 2)



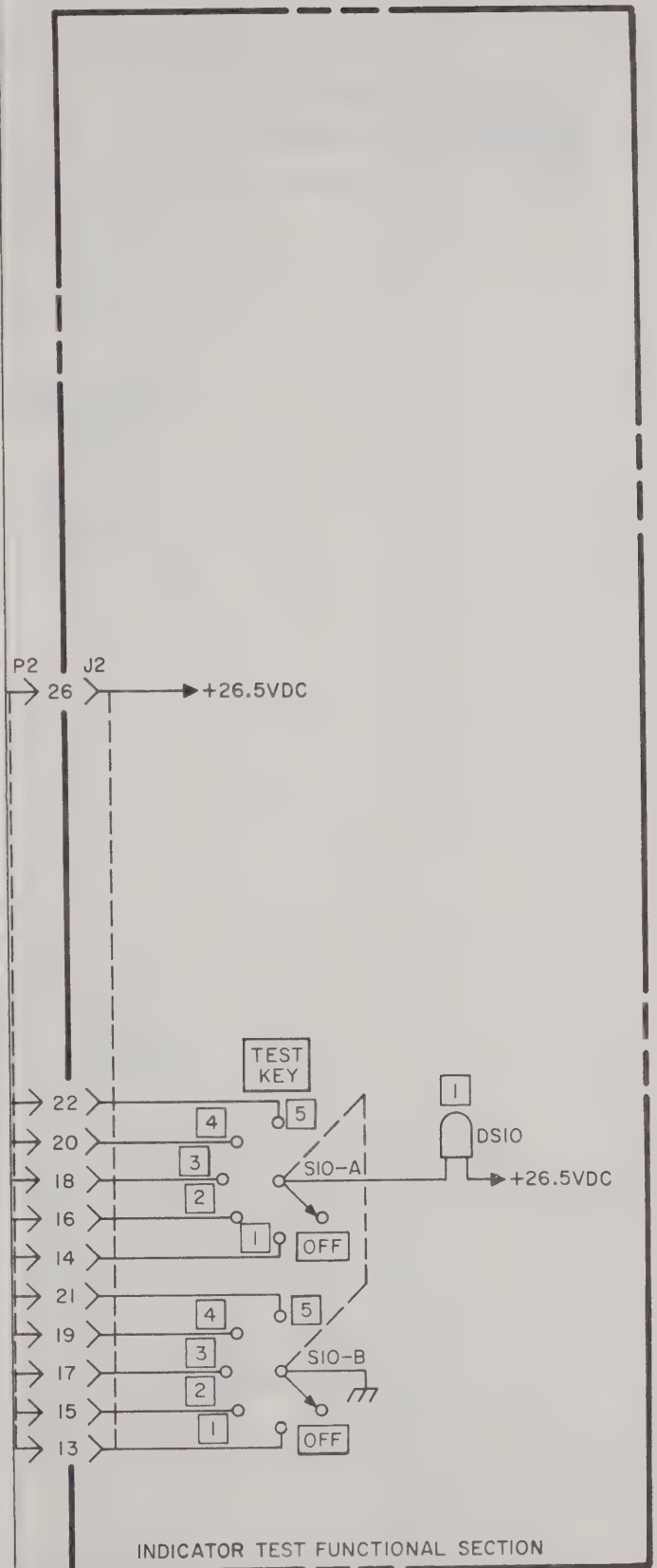


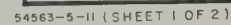
4-62



54563-5-10 (SHEET 2 OF 2)

Figure 4-25. Radio Set Control Functional Section, Servicing Block Diagram (Sheet 2 of 2)

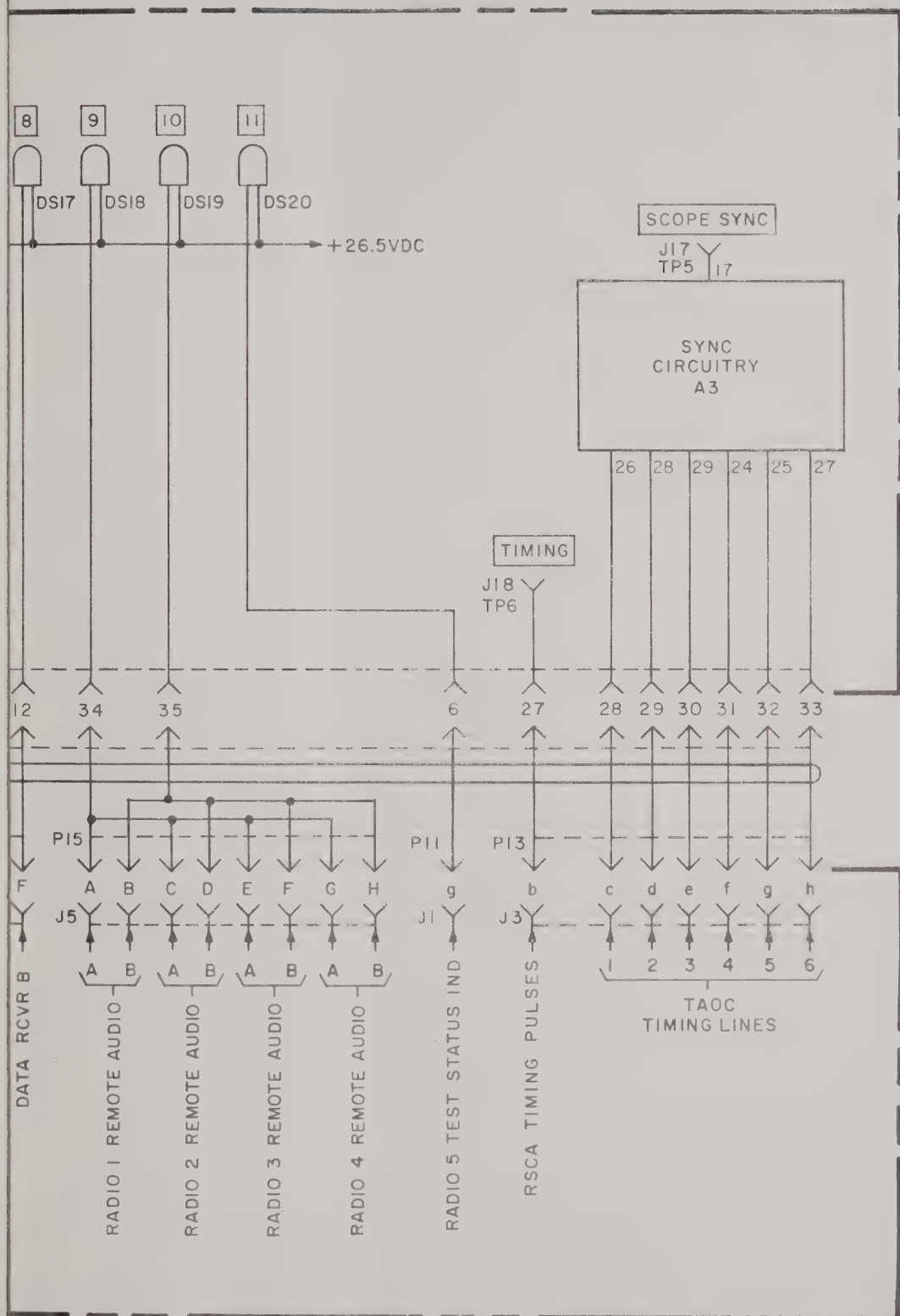




4-65

TM-6625-45/2-1

MK-1102, MK-1104, MX-8154
TROUBLESHOOTING





ORIGINAL

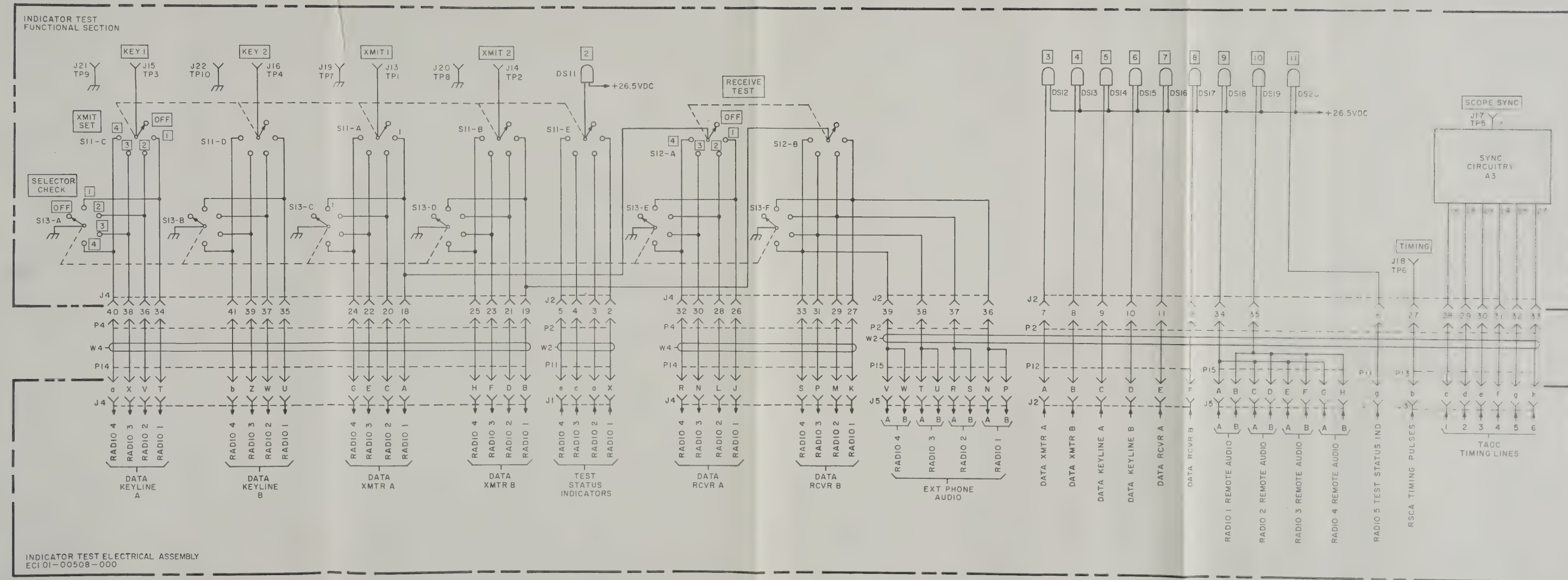
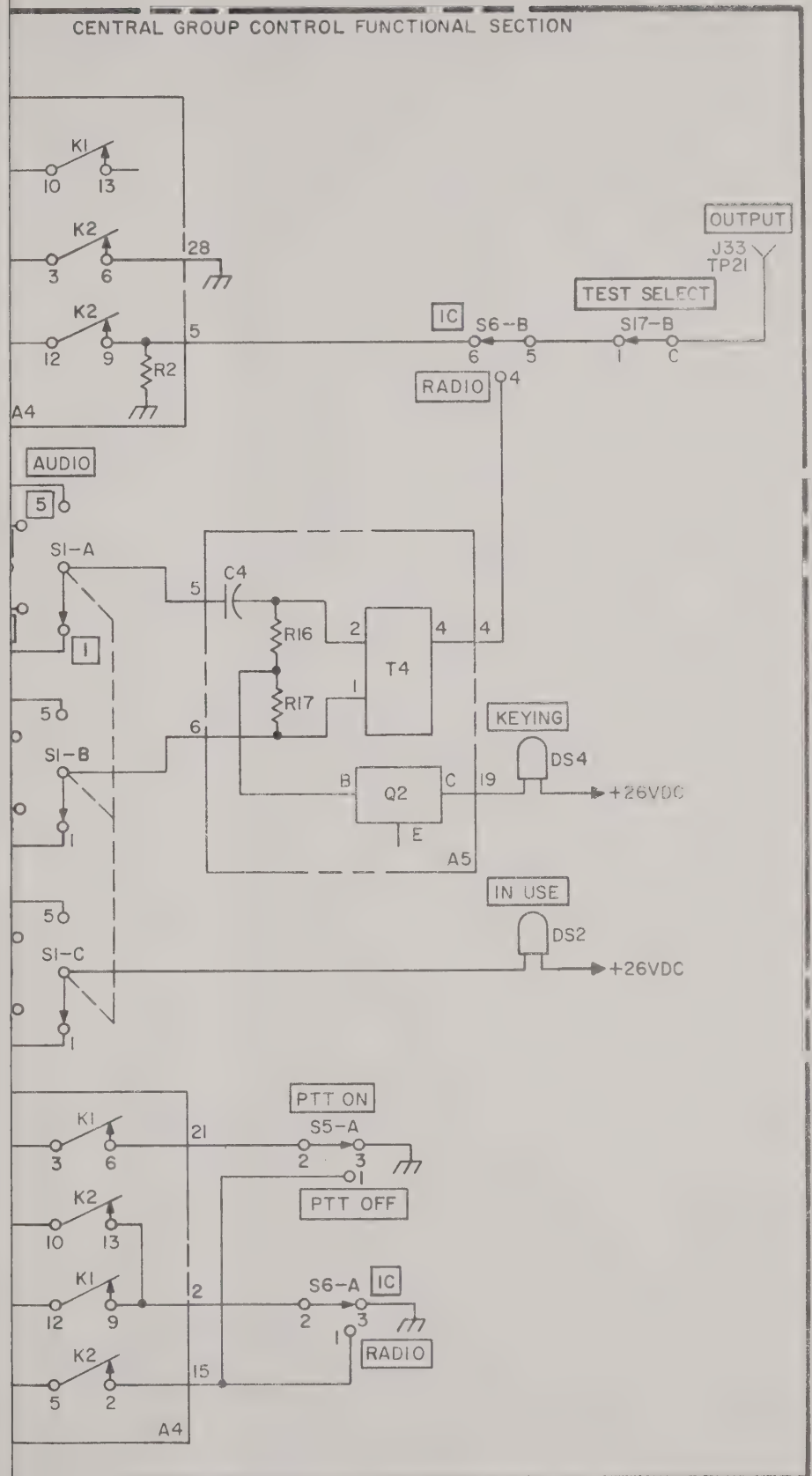


Figure 4-26. Indicator Test Functional Section, Servicing Block Diagram (Sheet 2 of 2)



Control Group Functional Section, Servicing Block Diagram

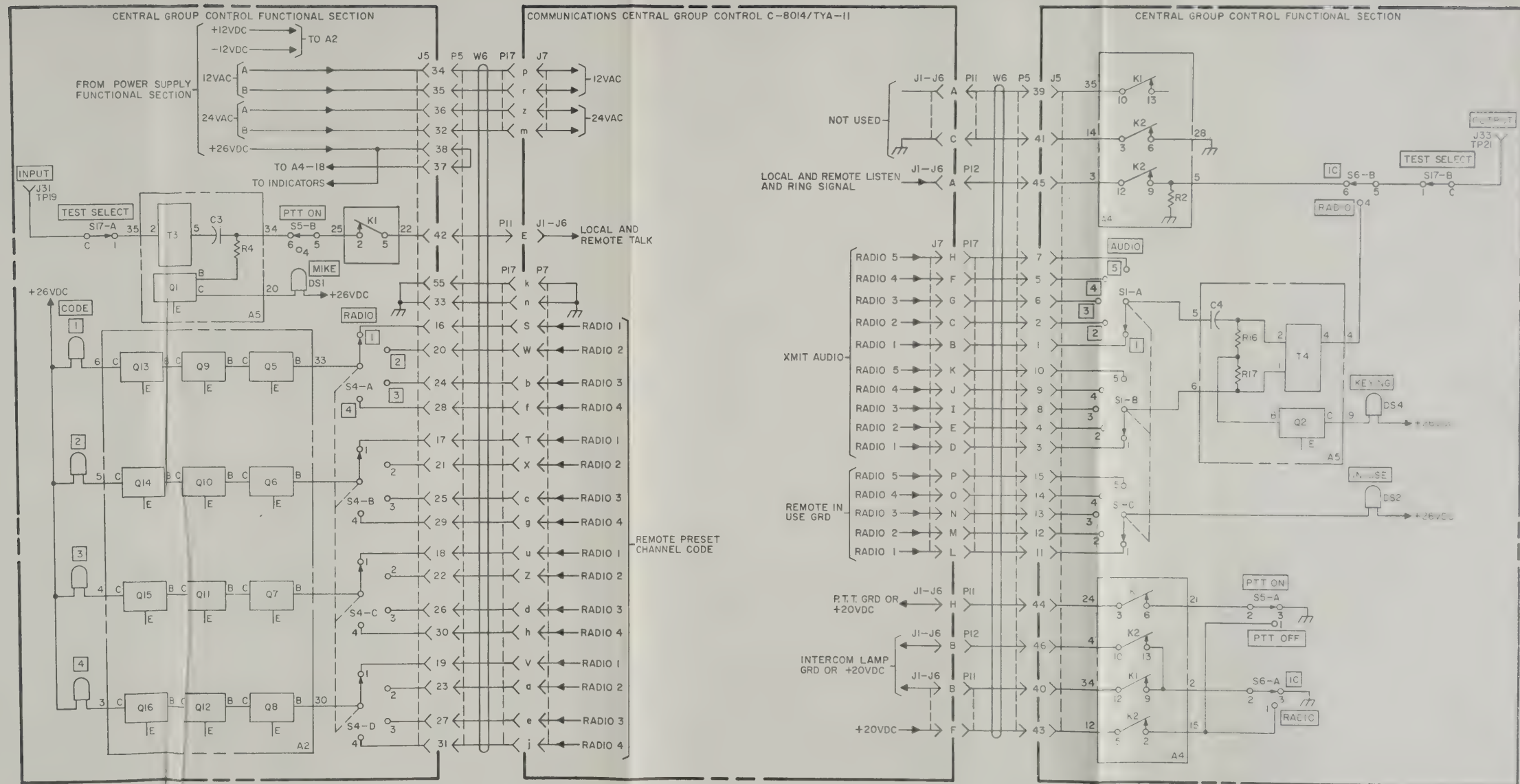


Figure 4-27. Control Group Functional Section, Servicing Block Diagram

ORIGINAL

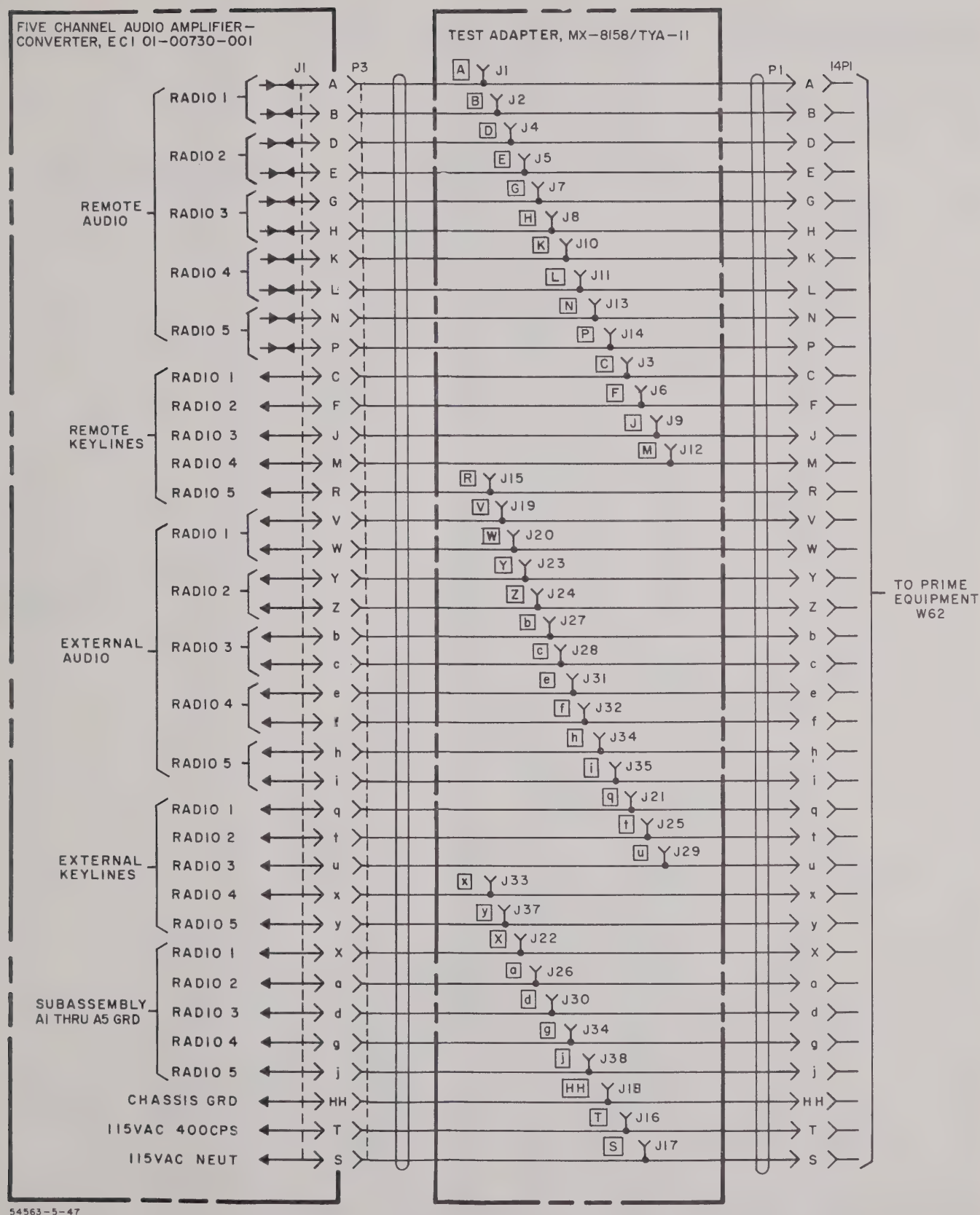


Figure 4-28. Test Set Coupler, MX-8153/TYA-11, Servicing Block Diagram (Sheet 1 of 2)

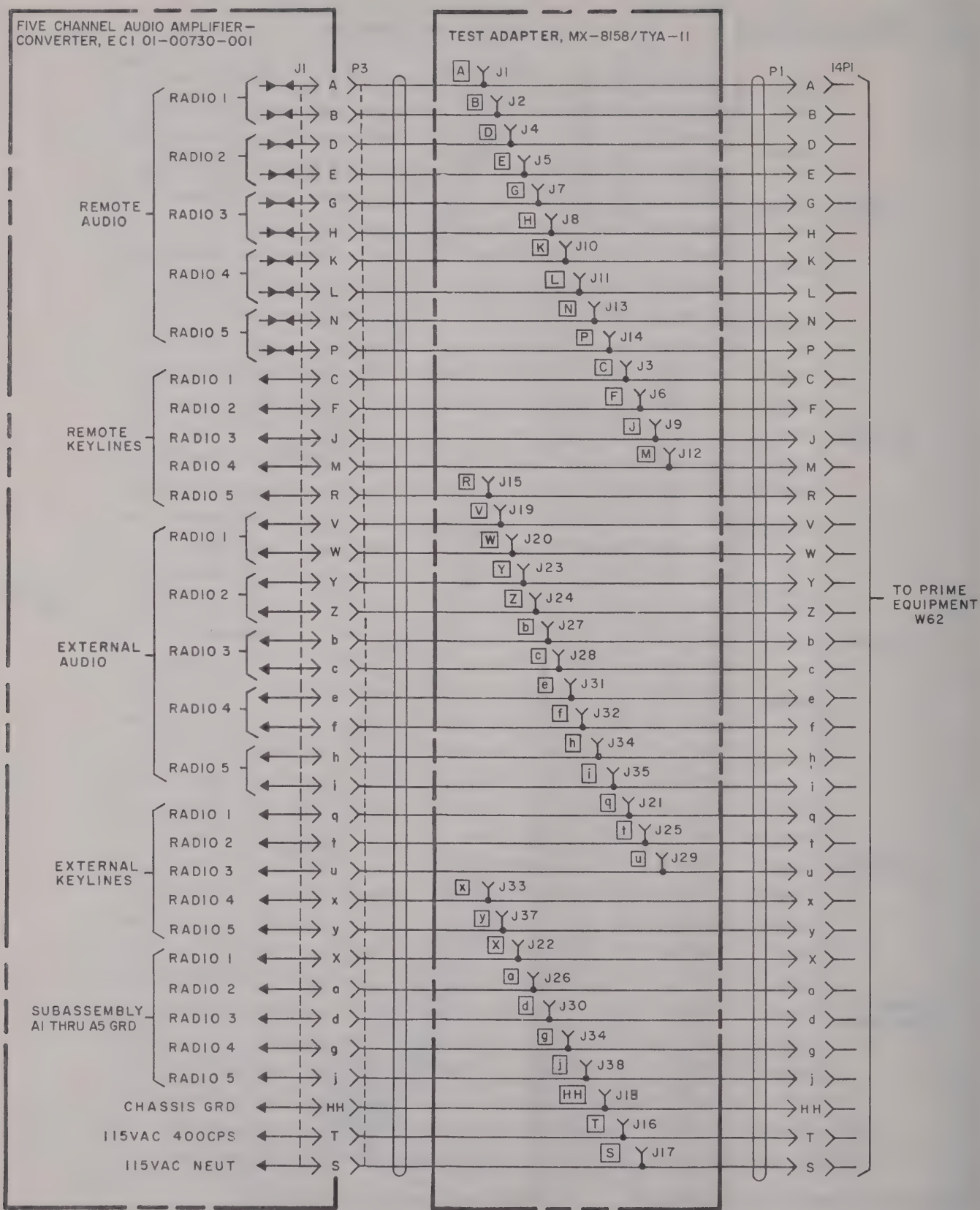


Figure 4-28. Test Set Coupler, MX-8153/TYA-11, Servicing Block Diagram (Sheet 1 of 2)

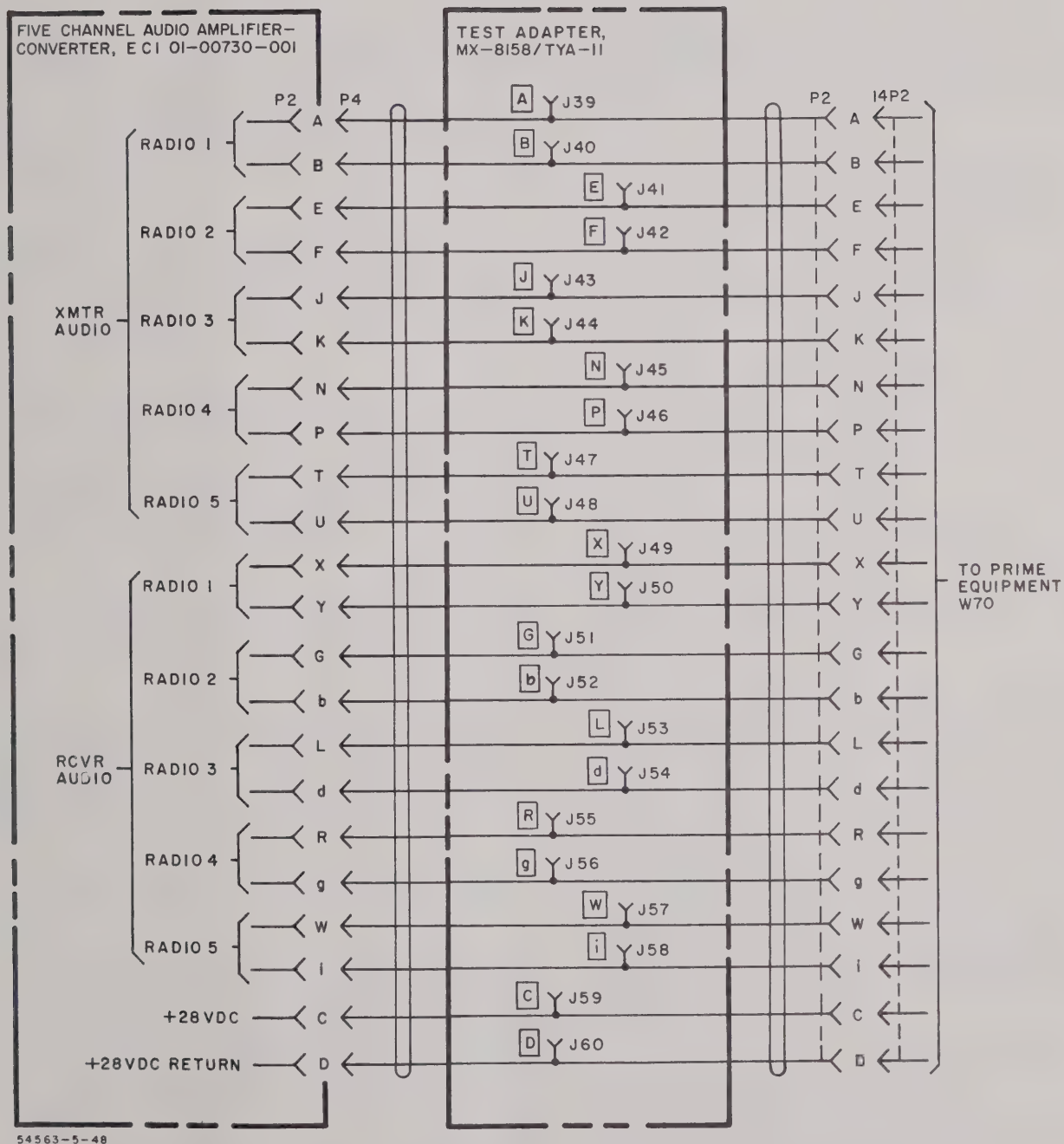


Figure 4-28. Test Set Coupler, MX-8153/TYA-11, Servicing Block Diagram (Sheet 2 of 2)

SECTION 5

MAINTENANCE

5-1. FAILURE, AND PERFORMANCE AND OPERATIONAL REPORTS. All record and report forms which are required by current directives to be maintained by maintenance facilities shall be carefully processed in accordance with such directives.

5-2. REPAIR INSTRUCTIONS. Repair instructions consist of removal, repair, replacement, and lubrication procedures for test equipment contained in Communications Test Kits, MK-1102/TYA-11 and MK-1104/TYA-11, and Test Set Coupler, MX-8154/TYA-11.

a. COMMUNICATIONS TEST KIT, MK-1102/TYA-11, REPAIR INSTRUCTIONS. Procedures for the removal, repair, and replacement of components which are part of test equipment in Communications Test Kit, MK-1102/TYA-11, are given in the following paragraphs only where the procedures are not obvious.

(1) Removal. Removal procedures for components in the test equipment contained in Communications Test Kit, MK-1102/TYA-11, are obvious.

(2) Repair. Repair procedures for the test equipment contained in Communications Test Kit, MK-1102/TYA-11, consist of replacing defective components or wiring. For these procedures and other general repair information, make reference to NAVSHIPS 0967-000-0120.

(3) Replacement. All test equipment components are replaced in reverse order of removal.

(4) Lubrication. The only test equipment contained in Communications Test Kit, MK-1102/TYA-11, that requires lubrication is Radio Set Control, C-3811/AR. Radio Set Control, C-3811/AR, gear assembly requires lubrication using grease conforming to Federal Specification, MIL-G-3278.

b. COMMUNICATIONS TEST KIT, MK-1104/TYA-11, REPAIR INSTRUCTIONS. Procedures for the removal, repair, and replacement of components which are part of test equipment in Communications Test Kit, MK-1104/TYA-11, are given in the following paragraphs only where the procedures are not obvious.

(1) Removal. Removal procedures for components in the test equipment contained in Communications Test Kit, MK-1104/TYA-11, are obvious.

(2) Repair. Repair procedures for the test equipment contained in Communications Test Kit, MK-1104/TYA-11, consist of replacing defective components or wiring. For these procedures and other general repair information, reference shall be made to NAVSHIPS 0967-000-0120.

(3) Replacement. All test equipment components are replaced in reverse order of removal.

(4) Lubrication. Test equipment in Communications Test Kit, MK-1104/TYA-11, does not require any lubrication.

c. TEST SET COUPLER, MX-8154/TYA-11, REPAIR INSTRUCTIONS. Procedures for the removal, repair, and replacement of Test Set Coupler, MX-8154/TYA-11, components are given in the following paragraphs only where the procedures are not obvious.

(1) Removal. To gain access to components within Test Set Coupler, MX-8154/TYA-11, the fasteners securing the front panel to the transit case must be loosened. After loosening the fasteners, the Control Group Test Set, ECI 01-00784-001, can be removed from the transit case allowing access to all test set components.

(2) Repair. Repair procedures for Test Set Coupler, MX-8154/TYA-11, consist of replacing defective components or wiring. For these procedures, and other general repair information, reference shall be made to NAVSHIPS 0967-000-0120.

(3) Replacement. All components are replaced in reverse order of removal.

(4) Lubrication. Test Set Coupler, MX-8154/TYA-11, does not require any lubrication.

5-3. ADJUSTMENT PROCEDURES. The following paragraphs contain adjustment procedures for Test Adapter, MX-8152/TYA-11; Test Set Coupler, MX-8153/TYA-11; 12-Volt Regulator, ECI 61-00967-001; and Transformers and Light

Drivers, ECI 61-00945-001. Test Adapter, MX-8152/TYA-11, and Test Set Coupler, MX-8153/TYA-11, are part of Communications Test Kit, MK-1102/TYA-11. The 12-Volt Regulator, ECI 61-00967-001, and Transformer and Light Drivers, ECI 61-00945-001, are part of Test Set Coupler, MX-8154/TYA-11. Other test equipment contained in the Communications Test Kits, MK-1102/TYA-11, and MK-1104/TYA-11 and assemblies located in the Test Set Coupler, MX-8154/TYA-11, require no adjustment.

a. TEST ADAPTER, MX-8152/TYA-11, ADJUSTMENT.

(1) Remove Test Adapter, MX-8152/TYA-11, cover to gain access to 28-Volt Regulator Printed Wiring Board, ECI 61-00929-001.

(2) Apply facility phase A, phase B, and neutral to P3 on Test Adapter, MX-8152/TYA-11.

(3) Connect Multimeter, AN/USM-116, set to indicate dc volts to test jack W (28VDC) and test jack X (DC RET) on Test Adapter, MX-8152/TYA-11, front panel.

(4) On Test Adapter, MX-8152/TYA-11, set AC ON-OFF switch to ON; AC indicator lamp goes on.

(5) On Test Adapter, MX-8152/TYA-11, set DC ON-OFF switch to ON; DC indicator lamp goes on.

(6) On 28-Volt Regulator Printed Wiring Board, ECI 61-00929-001, in Test Adapter, MX-8152/TYA-11, adjust potentiometer R8 to obtain $+28 \pm 2.8$ vdc indication on Multimeter, AN/USM-116.

(7) On Test Adapter, MX-8152/TYA-11, set DC ON-OFF and AC ON-OFF switches to OFF; DC and AC indicator lamps go off.

(8) Disconnect Multimeter, AN/USM-116 and facility power from Test Adapter, MX-8152/TYA-11.

(9) Replace cover on Test Adapter, MX-8152/TYA-11.

b. TEST SET COUPLER, MX-8153/TYA-11, ADJUSTMENT.

(1) +28-Volt Regulator Printed Wiring Board A1, ECI 61-00929-001, Adjustment.

(a) Remove Test Set Coupler, MX-8153/TYA-11, cover to gain access to 28-Volt Regulator Printed Wiring Board, ECI 61-00929-001.

(b) Apply facility power phase A, phase B, and neutral to P1 on Test Set Coupler, MX-8153/TYA-11.

(c) Set Multimeter, AN/USM-116, to indicate dc volts and connect to test jack 3 (P1, +28) and test jack 1 (P1, DC RET) on Test Set Coupler, MX-8153/TYA-11, front panel.

(d) On Test Set Coupler, MX-8153/TYA-11, set AC ON-OFF switch to ON; AC indicator lamp goes on.

(e) On Test Set Coupler, MX-8153/TYA-11, set DC ON-OFF switch to ON; DC indicator lamp goes on.

(f) On 28-Volt Regulator Printed Wiring Board, ECI 61-00929-001, in Test Set Coupler, MX-8153/TYA-11, adjust potentiometer R8 to obtain a $+28 \pm 2.8$ vdc indication on Multimeter, AN/USM-116.

(g) On Test Set Coupler, MX-8153/TYA-11, set DC ON-OFF switch to OFF; DC indicator lamp goes off.

(h) Disconnect Multimeter, AN/USM-116 from Test Set Coupler, MX-8153/TYA-11.

Note

IF THE SERVOTUNE SIGNAL REQUIRES ADJUSTMENT, OMIT PROCEDURES IN STEPS 5-3b(1)(i) THROUGH 5-3b(1)(k), AND STEPS 5-3b(2)(a) THROUGH 5-3b(2)(c), PROCEED WITH STEP 5-3b(2)(d). IF SERVOTUNE SIGNAL DOES NOT REQUIRE ADJUSTMENT, PROCEED WITH STEP 5-3b(1)(i).

(i) On Test Set Coupler, MX-8153/TYA-11, set AC switch to OFF; AC indicator lamp goes out.

(j) Disconnect facility power from Test Set Coupler, MX-8153/TYA-11.

(k) Replace cover on Test Set Coupler, MX-8153/TYA-11.

(2) Servotune Signal Adjustment.

(a) Remove Test Set Coupler, MX-8153/TYA-11, cover to gain access to 18/28-Volt Power Supply Printed Wiring Board A2, ECI 61-00928-001.

(b) Apply facility power phase A, phase B, and neutral to P1 on Test Set Coupler, MX-8153/TYA-11.

(c) On Test Set Coupler, MX-8153/TYA-11, set AC ON-OFF switch to ON; AC indicator lamp goes on.

(d) Set Multimeter, AN/USM-116, to indicate AC volts and connect to 46 (P2, SERVO TUNE) and to 1 (P1, DC RET) on Test Set Coupler, MX-8153/TYA-11.

(e) On 18/28-Volt Power Supply Printed Wiring Board A2, ECI 61-00928-001, in Test Set Coupler, MX-8153/TYA-11, adjust potentiometer R1 to obtain 1.0 ± 0.5 vac indication on Multimeter, AN/USM-116.

(f) On Test Set Coupler, MX-8153/TYA-11, set AC ON-OFF switch to OFF; AC indicator lamp goes off.

(g) Disconnect facility power and Multimeter, AN/USM-116 from Test Set Coupler, MX-8153/TYA-11.

(h) Replace cover on Test Set Coupler, MX-8153/TYA-11.

c. TEST SET COUPLER, MX-8154/TYA-11, ADJUSTMENT.

(1) +12 Volt Regulator Printed Wiring Board A1, ECI 61-00967-001, Adjustment.

(a) Remove Control Group Test Set, ECI 01-00784-001, from transit case in accordance with paragraph 5-2c(1).

(b) Connect Special Purpose Electrical Cable Assembly W8, ECI 12-01303-001, between POWER connector on Control Group Test Set, ECI 01-00784-001, and facility power, 115 vac, single phase, 400 cps and neutral.

(c) On Control Group Test Set, ECI 01-00784-001, set AC POWER ON-OFF switch to ON; AC POWER indicator lamp goes on.

(d) On Control Group Test Set, ECI 01-00784-001, set DC POWER ON-OFF switch to ON; DC POWER indicator lamp goes on.

(e) On Control Group Test Set, ECI 01-00784-001, connect Multimeter, AN/USM-116 set to indicate dc volts to +12 test jack and GRD connections.

(f) On +12 Volt Regulator Printed Wiring Board A1, ECI 61-00967-001, in Control Group Test Set, ECI 01-00784-001, adjust potentiometer to obtain +12 vdc indication on Multimeter, AN/USM-116.

(g) Disconnect Multimeter, AN/USM-116 from Control Group Test Set, ECI 01-00784-001.

Note

IF TRANSFORMERS AND LIGHT DRIVERS PRINTED WIRING BOARD A5, ECI 61-00945-001, REQUIRES ADJUSTMENT, OMIT PROCEDURES IN STEPS 5-3c(1)(h) THROUGH 5-3c(1)(j), AND STEPS 5-3c(2)(a) THROUGH 5-3c(2)(d), PROCEED WITH STEPS 5-3c(2)(e). IF TRANSFORMERS AND LIGHT DRIVERS PRINTED WIRING BOARD A5, ECI 61-00945-001, DOES NOT REQUIRE ADJUSTMENT, PROCEED WITH STEP 5-3c(1)(h).

(h) On Control Group Test Set, ECI 01-00784-001, set DC POWER ON-OFF and AC POWER ON-OFF switches to OFF; DC POWER and AC POWER indicator lamps go out.

(i) Disconnect Special Purpose Electrical Cable Assembly W8, ECI 12-01303-001, from the Control Group Test Set, ECI 01-00784-001 and the facility power source.

(j) Replace and secure Control Group Test Set, ECI 01-00784-001 in transit case.

(2) Transformers and Light Drivers Printed Wiring Board A5, ECI 61-00945-001, Adjustment.

(a) Remove Control Group Test Set, ECI 01-00784-001, from transit case in accordance with paragraph 5-2c(1).

(b) Connect Special Purpose Electrical Cable Assembly W8, ECI 12-01303-001, between POWER connector on Control Group Test Set, ECI 01-00784-001, and facility power, 115 vac, single phase, 400 cps and neutral.

(c) On Control Group Test Set, ECI 01-00784-001, set AC POWER ON-OFF switch to ON; AC POWER indicator lamp goes on.

(d) On Control Group Test Set, ECI 01-00784-001, set DC POWER ON-OFF switch to ON; DC POWER indicator lamp goes on.

(e) Connect Multimeter, AN/PSM-4 to indicate amps between connector J3-23 and GRD connection on Control Group Test Set, ECI 01-00784-001.

(f) On Transformers and Light Drivers Printed Wiring Board A5, ECI 01-00945-001,

in Control Group Test Set, ECI 01-00784-001, adjust potentiometer R2 to obtain 220 ua indication on Multimeter, AN/PSM-4.

(g) On Control Group Test Set, ECI 01-00784-001, set DC POWER and AC POWER switches to OFF; DC POWER and AC POWER indicators go out.

(h) Disconnect Multimeter, AN/PSM-4 and Special Purpose Electrical Cable Assembly W8, ECI 12-01303-001, from Control Group Test Set, ECI 01-00784-001, facility power.

(i) Replace and secure Control Group Test Set, ECI 01-00784-001, in transit case.

5-4. ILLUSTRATIONS. Illustrations and wiring lists pertaining to Communications Test Kits, MK-1102/TYA-11 and MK-1104/TYA-11, and Test Set Coupler, MX-8154/TYA-11, are contained in this section. The illustrations and wiring information are divided into the following areas; part location illustrations (paragraph 5-4a), wire running lists (paragraph 5-4b), ac primary power schematic diagrams (paragraph 5-4c), and equipment schematic diagrams (paragraph 5-4d).

a. PART LOCATION ILLUSTRATIONS. Equipment contained in Communications Test Kits, MK-1102/TYA-11 and MK-1104/TYA-11, and Test Set Coupler, MX-8154/TYA-11, requiring parts location illustrations are shown in Figures 5-1 through 5-16. Table 5-1, Assembly-to-Part Location Cross-Reference List, lists the test equipment requiring part location illustrations and the part location figure number. Each electrical part is identified by reference

designation and test points referenced in Section 4 are shown on the part location illustrations.

b. WIRE RUNNING LISTS. Test adapters and cables for which there are wire running lists are listed in Table 5-2, Wire Running Lists. Table 5-2 lists the equipment by name, reference designation, designation or part number, and table number. Single-conductor cables, card extenders which are wired pin-for-pin, and equipment for which a schematic is shown as part of this section are not included in the wire running lists. Each wire running list also contains connector mating information and signal functions and names.

c. AC PRIMARY POWER SCHEMATIC DIAGRAMS. Ac primary power schematic diagrams for the Test Adapter, MX-8152/TYA-11, Test Set Coupler, MX-8153/TYA-11; and Test Set Coupler, MX-8154/TYA-11, are shown in Figures 5-17 through 5-19, respectively. The two test fixtures are part of the Communications Test Kit, MK-1102/TYA-11.

d. EQUIPMENT SCHEMATIC DIAGRAMS. Equipment schematic diagrams are listed in Table 5-3, Schematic Diagrams. Table 5-3 lists the equipment by name, part number, and the figure number of the schematic diagram. Included as part of each schematic diagram, if applicable, is a transistor voltage chart. Schematic diagrams which contain over 100 parts use coordinates at the top, bottom, and sides in conjunction with a table as part of the schematic diagram to aid in locating any individual parts. Notes on each diagram contain the connector mating information.

TABLE 5-1. ASSEMBLY-TO-PART LOCATION CROSS-REFERENCE LIST

REFERENCE DESIGNATION	ASSEMBLY NOMENCLATURE	DESIGNATION OR PART NUMBER	PART LOCATION FIGURE
-	<u>Communications Test Kit</u>	MK-1102/TYA-11	-
-	Test Adapter	MX-8150/TYA-11	5-1
-	Test Adapter	MX-8151/TYA-11	5-2
-	Test Adapter	MX-8152/TYA-11	5-3
A1	+28 Volt Power Supply	ECI 61-00929-001	5-4
-	Heat Sink	ECI 67-02324-001	5-5
-	Test Set Coupler	MX-8153/TYA-11	5-6
A1	+28 Volt Power Supply	ECI 61-00929-001	5-4
-	Heat Sink	ECI 67-02324-001	5-5
A2	18/28-Volt Power Supply	ECI 61-00928-001	5-7
-	Heat Sink	ECI 67-02325-001	5-8
-	Radio Set Control	C-3811/AR	5-9

TABLE 5-1. (Continued)

REFERENCE DESIGNATION	ASSEMBLY NOMENCLATURE	DESIGNATION OR PART NUMBER	PART LOCATION FIGURE
-	<u>Communications Test Kit</u>	MK-1104/TYA-11	-
-	Test Adapter	MX-8158/TYA-11	5-10
-	Test Set Coupler	MX-8154/TYA-11	5-11
A1	+12 Volt Regulator	ECI 61-00967-001	5-12
A2	Light Driver	ECI 61-00943-001	5-13
A3	Pulse Generator and Sync Circuitry	ECI 61-00942-001	5-14
A4	Transformer and Control Relay	ECI 61-00944-001	5-15
A5	Transformer and Light Drivers	ECI 61-00945-001	5-16

TABLE 5-2. WIRE RUNNING LISTS

NOMENCLATURE	REF DESIG	DESIGNATION OR PART NUMBER	TABLE NUMBER
<u>Communications Test Kit</u>	-	MK-1102/TYA-11	-
Test Adapter	-	MX-8150/TYA-11	5-4
Test Adapter	-	MX-8151/TYA-11	5-5
Special Purpose Electrical Cable Assembly	W3	CX-10916/TYA-11	5-6
Special Purpose Electrical Cable Assembly	W4	CX-10917/TYA-11	5-7
Electrical Power Cable Assembly	W1	CX-10932/TYA-11	5-8
Electrical Power Cable Assembly	W2	CX-10933/TYA-11	5-9
<u>Communications Test Kit</u>	-	MX-1104/TYA-11	-
Test Adapter	-	MX-8158/TYA-11	5-10
Special Purpose Electrical Cable Assembly	W3	CX-10920/TYA-11	5-11
Special Purpose Electrical Cable Assembly	W4	CX-10919/TYA-11	5-12
Special Purpose Electrical Cable Assembly	W5	CX-10918/TYA-11	5-13
Special Purpose Electrical Cable Assembly	W6	CX-10928/TYA-11	5-14
Special Purpose Electrical Cable Assembly	W2	CX-10929/TYA-11	5-15
Branched Special Purpose Electrical Cable Assembly	W1	CX-10930/TYA-11	5-16
Branched Special Purpose Electrical Cable Assembly	W7	CX-10931/TYA-11	5-17
<u>Test Set Coupler</u>	-	MX-8154/TYA-11	-
Branched Special Purpose Electrical Cable Assembly	W1	ECI 16-01286-001	5-18
Branched Special Purpose Electrical Cable Assembly	W2	ECI 16-01287-001	5-19
Branched Special Purpose Electrical Cable Assembly	W3	ECI 16-01288-001	5-20
Branched Special Purpose Electrical Cable Assembly	W4	ECI 16-01289-001	5-21
Branched Special Purpose Electrical Cable Assembly	W5	ECI 16-01290-001	5-22
Branched Special Purpose Electrical Cable Assembly	W6	ECI 16-01291-001	5-23
Branched Special Purpose Electrical Cable Assembly	W7	ECI 16-01292-001	5-24
Branched Special Purpose Electrical Cable Assembly	W8	ECI 16-01303-001	5-25

TABLE 5-3. SCHEMATIC DIAGRAMS

NOMENCLATURE	REF DESIG	DESIGNATION OR PART NUMBER	FIGURE NUMBER
<u>Communications Test Kit</u>	-	MK-1102/TYA-11	-
Test Adapter	-	MX-8152/TYA-11	5-20
Test Set Coupler	-	MX-8153/TYA-11	5-21
Radio Set Control	-	C-3811/AR	5-22
<u>Test Set Coupler</u>	-	MX-8154/TYA-11	5-23
+12-Volt Regulator	A1	ECI 61-00967-001	5-24
Light Drivers	A2	ECI 61-00943-001	5-25
Pulse Generator and Sync Circuitry	A3	ECI 61-00942-001	5-26
Transformers and Control Relay	A4	ECI 61-00944-001	5-27
Transformers and Light Drivers	A5	ECI 61-00945-001	5-28

TABLE 5-4. TEST ADAPTER, MX-8150/TYA-11, WIRE RUNNING LIST

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
1	P2 (mates with A7A1 J2 on Radio Set, AN/ GRC-112)	A	J1	-	Preset binary code
2		B	J2	-	Preset binary code
3		C	J3	-	Preset binary code
4		D	J4	-	Preset binary code
5		E	J5	-	Not used
6		F	J6	-	Ground
7		G	J7	-	Narrow band audio in
8		H	J8	-	Narrow band audio in
9		K	J9	-	Narrow band audio out
10		L	J10	-	Narrow band audio out
11		N	J11	-	Keying ground
12		P	J12	-	Keying ground
13		T	J13	-	Remote voice indicator
14		U	J14	-	Remote voice indicator
15		V	J15	-	FSK data in
16		W	J16	-	FSK data in
17		X	J17	-	FSK keying
18		Z	J18	-	FSK keying
19		a	J19	-	FSK data out
20		b	J20	-	FSK data out

TABLE 5-4. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
21		c	J21	-	Remote test key
22		d	J22	-	Remote test key
23		e	J23	-	Remote test indicator
24		f	J24	-	Remote test indicator
25		g	J25	-	Remote equipment on indicator
26		h	J26	-	Remote equipment on indicator
27		j	J27	-	Out of service indicator
28		k	J28	-	Out of service indicator
29		m	J29	-	Data indicator
30		n	J30	-	Data indicator
31	P3 (mates with A7A1 J3 on Radio Set, AN/GRC-112)	A	J31	-	Tens voltage
32		C	J32	-	Units voltage
33		E	J33	-	Tenths voltage
34		G	J34	-	Adder return
35		J	J35	-	Tap 11 servo command voltage
36		L	J36	-	Servo command ground
37		M	J37	-	Tap 13 servo command voltage
38		N	J38	-	Tap function
39		S	J39	-	Hundreds ground
40		T	J40	-	+28 vdc servo tune gate
41	P3 (mates with A7A1 J3 on Radio Set, AN/GRC-112) (Cont)	U	J41	-	Hundredths voltage
42		V	J42	-	High track
43		X	J43	-	Low track
44		Z	J44	-	115 vac neutral
45		a	J45	-	115 vac phase B
46	P4 (mates with P1 on Special Purpose Electrical Cable Assembly, CX-10917/TYA-11)	b	J46	-	Ground
47		d	J47	-	+28 vdc from power supply
48		R	J48	-	+28 vdc
49		A	J49	-	Tens voltage
50		C	J50	-	Units voltage
51		E	J51	-	Tenths voltage
52		G	J52	-	Adder return
53		J	J53	-	Tap 11 servo command voltage
54		e	J54	-	Servo command ground
55		p	J55	-	Tap 13 servo command voltage

TABLE 5-4. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
56		R	J56	-	Tap function
57		S	J57	-	Hundreds ground
58		L	J58	-	+28 vdc servo tune gate
59		M	J59	-	Hundredths voltage
60		N	J60	-	High track
61		T	J61	-	Low track
62		b	J62	-	120 vac neutral
63		c	J63	-	120 vac phase A
64		d	J64	-	120 vac phase B
65		X	J65	-	Chassis ground
66		W	J66	-	+28 vdc
67		h	J67	-	Servo position gate
68		j	J68	-	Chassis ground
69		g	J69	-	Wide band audio in
70		s	J70	-	Wide band audio out
71		r	J71	-	Wide band select
72	P3 (mates with A7A1 J3 on Radio Set, AN/GRC-112)	B	Shield of wire 31	-	Shield
73		D	Shield of wire 32	-	Shield
74		F	Shield of wire 33	-	Shield
75		H	Shield of wire 34	-	Shield
76		K	Shield of wire 35	-	Shield
77		P	Shield of wire 38	-	Shield
78		W	Shield of wire 43	-	Shield
79		Y	Shield of wire 44	-	Shield

TABLE 5-5. TEST ADAPTER, MX-8151/TYA-11, WIRE RUNNING LIST

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
1	P1 (mates with A4A1 J1 on Radio Set, AN/GRC-134)	A	J1	-	Wide band key
2		E	J2	-	Wide band audio out
3		F	J3	-	+28 vdc
4		G	J4	-	+28 vdc
5		H	J5	-	Narrow band audio out
6		J	J6	-	Narrow band audio out
7		L	J7	-	Remote keyline
8		M	J8	-	Remote keyline
9		P	J9	-	Remote test key
10		Q	J10	-	Remote test key

TABLE 5-5. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
11		R	J11	-	Radio 5 voice indicator
12		S	J12	-	Radio 5 voice indicator
13		U	J13	-	Remote test indicator
14		V	J14	-	Remote test indicator
15		W	J15	-	Wide band audio in
16		X	J16	-	Narrow band audio in
17		Y	J17	-	Narrow band audio in
18		K	Shield of wires 5 and 6	-	Shield
19		N	Shield of wire 2	-	Shield
20		T	Shield of wire 15	-	Shield
21		Z	Shield of wires 16 and 17	-	Shield

TABLE 5-6. SPECIAL PURPOSE
ELECTRICAL CABLE ASSEMBLY W3, CX-10916/TYA-11, WIRE RUNNING LIST

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
1	P1 (mates with J1401 on Radio Set Control, C-3811/AR)	18	P2 (mates with J1 on Test Adapter,	18	Ground
2		19	MX-8152/TYA-11 or	19	Chassis ground
3		33	J3 on Test Set Coupler, MX-8153/TYA-11	33	Tens voltage
4	Shield of wire 3		Shield of wire 5	-	Shield
5	P1 (see wire 1)	35	P2 (see wire 1)	35	Units voltage
6	Shield of wire 7 P1 (see wire 1)	22	Shield of wire 5	-	Shield
7		34	P2 (see wire 1)	34	Tenths voltages
8			Shield of wire 9	-	Shield
9		29	P2 (see wire 1)	29	Adder return
10		21	Shield of wire 9	-	Shield
11		13	P2 (see wire 1)	13	Hundreds relay
12		36		36	Hundredths digit
13		15		15	Even units ground
14		16		16	Power control relay
15		2		2	Tenths digit voltage

TABLE 5-6. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
16		3		3	Tenths digit voltage
17		4		4	Tenths digit voltage
18		5		5	Tenths digit voltage
19		6		6	Tenths digit voltage
20		7		7	Tenths digit voltage
21		8		8	Tenths digit voltage
22		9		9	Tenths digit voltage
23		10		10	Tenths digit voltage
24		1		1	Tenths digit voltage
25		14		14	+28 vdc
26		37		37	+28 vdc
27		23	Shield of wire 30	-	Shield
28		28	P2 (see wire 1)	28	Tap 1, 115 vac, phase B
29	Shield of wire 28	-	Shield of wire 33	-	Shield
30	P1 (see wire 1)	30	P2 (see wire 1)	30	Tap 11
31	Shield of wire 30	-	Shield of wire 33	-	Shield
32	P1 (see wire 1)	31	P2 (see wire 1)	31	Tap 12
33		32		32	Tap 13, ac neutral
34		26	Shield of wire 33	-	Shield
35		17	P2 (see wire 1)	17	Voice relay
36		27		27	Data relay
37	Shield of wire 33	-		26	Shield
38	Shield of wire 33	-	Shield of wire 28	-	Shield
39	Shield of wire 32	-	Shield of wire 30	-	Shield
40	Shield of wire 30	-	P2 (see wire 1)	23	Shield
41	Shield of wire 9	-		21	Shield
42	Shield of wire 9	-	Shield of wire 7	-	Shield
43	Shield of wire 5	-	P2 (see wire 1)	22	Shield
44	Shield of wire 5	-	Shield of wire 3	-	Shield

TABLE 5-7. SPECIAL PURPOSE ELECTRICAL
CABLE ASSEMBLY W4, CX-10917/TYA-11, WIRE RUNNING LIST

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
1	P1 (mates with P4 on on Test Adapter, MX-8150/TYA-11)	A	P2 (mates with A7A1 J4 on Radio Set, AN/GRC-112)	A	Tens voltage
2		B	Shield of wire 1	-	Shield
3		C	P2 (see wire 1)	C	Units voltage
4		D	Shield of wire 3	-	Shield
5		E	P2 (see wire 1)	E	Tenths voltage
6		F	Shield of wire 5	-	Shield
7		G	P2 (see wire 1)	G	Adder return
8		H	Shield of wire 7	-	Shield
9		J	P2 (see wire 1)	J	Tap 11 servo command voltage
10		K	Shield of wire 9	-	Shield
11		e	P2 (see wire 1)	e	Servo command ground
12		p		p	Tap 13 servo command voltage
13		R		R	Tap function
14		Z	Shield of wire 14	-	Shield
15		S	P2 (see wire 1)	S	Hundreds ground
16		L	Shield of wire 18 P2 (see wire 1)	L	+28 vdc servo tune gate
17		M		M	Hundredths voltage
18		N		N	High track
19		P		-	Shield
20		T		T	Low track
21		U	Shield of wire 20	-	Shield
22		b	P2 (see wire 1)	b	120 vac neutral
23		c		c	120 vac phase A
24		d		d	120 vac phase B
25		X		X	Chassis ground
26		W	Shield of wire 29	W	+28 vdc
27		h		h	Servo position gate
28		j		j	Chassis ground
29		s		s	Wide band audio out
30		k		-	Shield
31	Shield of wire 31 Shield of wire 29	g	P2 (see wire 1)	g	Wide band audio out
32		a	Shield of wire 31	-	Shield
33		r	P2 (see wire 1)	n	Wide band select
34		-		a	Shield
35		-		K	Shield
36	Shield of wire 20	-		U	Shield
37	Shield of wire 18	-		P	Shield
38	Shield of wire 13	-		Z	Shield
39	Shield of wire 9	-		K	Shield
40	Shield of wire 7	-		H	Shield

TABLE 5-7. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
41	Shield of wire 5	-	P2 (Continued)	F	Shield
42	Shield of wire 3	-		D	Shield
43	Shield of wire 1	-		B	Shield
44		n		n	

TABLE 5-8. ELECTRIC POWER CABLE ASSEMBLY W1, CX-10932/TYA-11, WIRE RUNNING LIST

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
1	P1 (mates with A7A1 J1 on Radio Set, AN/GRC-112)	B	P2 (mates with facility power connector)	A	Not used
2		C		B	120-208 vac, 400 cps, phase A
3		D		C	120-208 vac, 400 cps, phase B
4		E		D	120-208 vac, 400 cps, phase C
5		E	P1 (see wire 1)	F	Neutral and chassis ground

TABLE 5-9. ELECTRICAL POWER CABLE ASSEMBLY W2, CX-10933/TYA-11, WIRE RUNNING LIST

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
1	P1 (mates with facility power connector)	A	P2 (mates with A4A1 J2 on Radio Set, AN/GRC-134)	A	120-208 vac, 400 cps, phase A
2		B		B	120-208 vac, 400 cps, phase B
3		C		C	120-208 vac, 400 cps, phase C
4		D		D	Ac neutral
5		D		E	Chassis ground

TABLE 5-10. TEST ADAPTER, MX-8158/TYA-11, WIRE RUNNING LIST

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
-	P1 (mates with 14P1 on W62 in Communications Central Group, AN/TYA-11)	A	P3 (mates with J1 on Audio Amplifier-Converter, ECI 01-00730-001)	A	Radio 1 remote audio
-		A	J1	-	Radio 1 remote audio
-		B	P3 (see P3-A)	B	Radio 1 remote audio
-		B	J2	-	Radio 1 remote audio
-		C	P3 (see P3-A)	C	Radio 1 remote keylines
-		C	J3	-	Radio 1 remote keylines
-		D	P3 (see P3-A)	D	Radio 2 remote audio
-		D	J4	-	Radio 2 remote audio
-		E	P3 (see P3-A)	E	Radio 2 remote audio
-		E	J5	-	Radio 2 remote audio
-		F	P3 (see P3-A)	F	Radio 2 remote keylines
-		F	J6	-	Radio 2 remote keylines
-		G	P3 (see P3-A)	G	Radio 3 remote audio
-		G	J7	-	Radio 3 remote audio
-		H	P3 (see P3-A)	H	Radio 3 remote audio
-		H	J8	-	Radio 3 remote audio
-		J	P3 (see P3-A)	J	Radio 3 remote keylines
-		J	J9	-	Radio 3 remote keylines
-		K	P3 (see P3-A)	K	Radio 4 remote audio
-		K	J10	-	Radio 4 remote audio
-		L	P3 (see P3-A)	L	Radio 4 remote audio
-		L	J11	-	Radio 4 remote audio
-		M	P3 (see P3-A)	M	Radio 4 remote keylines
-		M	J12	-	Radio 4 remote keylines
-		N	P3 (see P3-A)	N	Radio 5 remote audio
-		N	J13	-	Radio 5 remote audio
-		P	P3 (see P3-A)	P	Radio 5 remote audio
-		P	J14	-	Radio 5 remote audio
-		R	P3 (see P3-A)	R	Radio 5 remote keylines
-		R	J15	-	Radio 5 remote keylines
-		S	P3 (see P3-A)	S	115 vac neutral
-		S	J17	-	115 vac neutral
-		T	P3 (see P3-A)	T	115 vac, 400 cps
-		T	J16	-	115 vac, 400 cps
-		V	P3 (see P3-A)	V	Radio 1 external audio

TABLE 5-10. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
-	P1 (Continued)	V	J19	-	Radio 1 external audio
-		W	P3 (see P3-A)	W	Radio 1 external audio
-		W	J20	-	Radio 1 external audio
-		X	P3 (see P3-A)	X	Radio 1 subassembly ground
-		X	J22	-	Radio 1 subassembly ground
-		Y	P3 (see P3-A)	Y	Radio 2 external audio
-		Y	J23	-	Radio 2 external audio
-		Z	P3 (see P3-A)	Z	Radio 2 external audio
-		Z	J24	-	Radio 2 external audio
-		HH	P3 (see P3-A)	HH	Chassis ground
-		HH	J18	-	Chassis ground
-		a	P3 (see P3-A)	a	Radio 2 subassembly ground
-		a	J26	-	Radio 2 subassembly ground
-		b	P3 (see P3-A)	b	Radio 3 external audio
-		b	J27	-	Radio 3 external audio
-		c	P3 (see P3-A)	c	Radio 3 external audio
-		c	J28	-	Radio 3 external audio
-		d	P3 (see P3-A)	d	Radio 3 subassembly ground
-		d	J30	-	Radio 3 subassembly ground
-		e	P3 (see P3-A)	e	Radio 4 external audio
-		e	J31	-	Radio 4 external audio
-		f	P3 (see P3-A)	f	Radio 4 external audio
-		f	J32	-	Radio 4 external audio
-		g	P3 (see P3-A)	g	Radio 4 subassembly ground
-		g	J34	-	Radio 4 subassembly ground
-		h	P3 (see P3-A)	h	Radio 5 external audio
-		h	J35	-	Radio 5 external audio
-		i	P3 (see P3-A)	i	Radio 5 external audio
-		i	J36	-	Radio 5 external audio
-		j	P3 (see P3-A)	j	Radio 5 subassembly ground
-		j	J38	-	Radio 5 subassembly ground
-		q	P3 (see P3-A)	q	Radio 1 external keylines
-		q	J21	-	Radio 1 external keylines
-		t	P3 (see P3-A)	t	Radio 2 external keylines
-		t	J25	-	Radio 2 external keylines
-		u	P3 (see P3-A)	u	Radio 3 external keylines
-		u	J29	-	Radio 3 external keylines
-		x	P3 (see P3-A)	x	Radio 4 external keylines
-		x	J33	-	Radio 4 external keylines
-		y	P3 (see P3-A)	y	Radio 5 external keylines

TABLE 5-10. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
-	P1 (Continued) P2 (mates with 14P2 on W70 in Commun- ications Central Group, AN/TYA-11)	Y	J37	-	Radio 5 external keylines
-		A	P4 (mates with J2 on Audio Amplifier- Converter, ECI 01- 00730-001)	A	Radio 1 xmtr audio
-		A	J39	-	Radio 1 xmtr audio
-		B	P4 (see P4-A)	B	Radio 1 xmtr audio
-		B	J40	-	Radio 1 xmtr audio
-		C	P4 (see P4-A)	C	+28 vdc
-		C	J59	-	+28 vdc
-		D	P4 (see P4-A)	D	+28 vdc return
-		D	J60	-	+28 vdc return
-		E	P4 (see P4-A)	E	Radio 2 xmtr audio
-		E	J41	-	Radio 2 xmtr audio
-		F	P4 (see P4-A)	F	Radio 2 xmtr audio
-		F	J42	-	Radio 2 xmtr audio
-		G	P4 (see P4-A)	G	Radio 2 revr audio
-		G	J51	-	Radio 2 revr audio
-		J	P4 (see P4-A)	J	Radio 3 xmtr audio
-		J	J43	-	Radio 3 xmtr audio
-		K	P4 (see P4-A)	K	Radio 3 xmtr audio
-		K	J44	-	Radio 3 xmtr audio
-		L	P4 (see P4-A)	L	Radio 3 revr audio
-		L	J53	-	Radio 3 revr audio
-		N	P4 (see P4-A)	N	Radio 4 xmtr audio
-		N	J45	-	Radio 4 xmtr audio
-		P	P4 (see P4-A)	P	Radio 4 xmtr audio
-		P	J46	-	Radio 4 xmtr audio
-		R	P4 (see P4-A)	R	Radio 4 revr audio
-		R	J55	-	Radio 4 revr audio
-		T	P4 (see P4-A)	T	Radio 5 xmtr audio
-		T	J47	-	Radio 5 xmtr audio
-		U	P4 (see P4-A)	U	Radio 5 xmtr audio
-		U	J48	-	Radio 5 xmtr audio
-		W	P4 (see P4-A)	W	Radio 5 revr audio
-		W	J57	-	Radio 5 revr audio
-		X	P4 (see P4-A)	X	Radio 1 revr audio
-		X	J49	-	Radio 1 revr audio

TABLE 5-10. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
-	P2 (Continued)	Y	P4 (see P4-A)	Y	Radio 1 rcvr audio
-		Y	J50	-	Radio 1 rcvr audio
-		b	P4 (see P4-A)	b	Radio 2 rcvr audio
-		b	J52	-	Radio 2 rcvr audio
-		d	P4 (see P4-A)	d	Radio 3 rcvr audio
-		d	J54	-	Radio 3 rcvr audio
-		g	P4 (see P4-A)	g	Radio 4 rcvr audio
-		g	J56	-	Radio 4 rcvr audio
-		i	P4 (see P4-A)	h	Radio 5 rcvr audio
-		i	J58	-	Radio 5 rcvr audio

TABLE 5-11. SPECIAL PURPOSE ELECTRICAL CABLE
ASSEMBLY, CX-10920/TYA-11, WIRE RUNNING LIST

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
1	P1 (mates with Radio Sets, AN/GRC-112 or AN/GRC-134 connector)	1	P2 (mates with P1 on Electronic Control Amplifier ECI 03-01592-001)	1	Position voltage
2		3		3	Tens
3		5		5	Units
4		12		12	
5		13		13	Motor control voltage
6		15		15	Tenths
7		17		17	Adder return
8		18		18	
9		24		24	
10		25		25	Motor control voltage
11		2		2	
12		4		4	
13		6		6	Servo command ground
14		7		7	+28 vdc servo tune gate
15		8		8	
16		9		9	
17		10		10	+28 vdc or 120v, 400 cps, phase B
18		11		11	
19		14		14	Free run ground
20		19		19	120v, 400 cps, phase B

TABLE 5-11. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
21	Shield of wire 1 at P1	21	Shield of wire 2 at P1	21	Neutral Not used
22		22		22	
23		-		-	
24		20		20	
25		-		-	Shield
26	Shield of wire 2 at P1	-	Shield of wire 3 at P1	-	Shield
27	Shield of wire 3 at P1	-	Shield of wire 4 at P1	-	Shield
28	Shield of wire 4 at P1	-	Shield of wire 5 at P1	-	Shield
29	Shield of wire 5 at P1	-	Shield of wire 6 at P1	-	Shield
30	Shield of wire 6 at P1	-	Shield of wire 7 at P1	-	Shield
31	Shield of wire 7 at P1	-	Shield of wire 8 at P1	-	Shield
32	Shield of wire 8 at P1	-	Shield of wire 10 at P1	-	Shield
33	Shield of wire 10 at P1	-	Shield of wire 9 at P1	-	Shield
34	P1 (see wire 1)	23	Shield of wire 9 at P1	-	Shield
35	Shield of wire 1 at P2	-	Shield of wire 2 at P2	-	Shield
36	Shield of wire 2 at P2	-	Shield of wire 3 at P2	-	Shield
37	Shield of wire 3 at P2	-	Shield of wire 4 at P2	-	Shield
38	Shield of wire 4 at P2	-	Shield of wire 5 at P2	-	Shield
39	Shield of wire 5 at P2	-	Shield of wire 6 at P2	-	Shield
41	Shield of wire 7 at P2	-	Shield of wire 8 at P2	-	Shield
42	Shield of wire 8 at P2	-	Shield of wire 10 at P2	-	Shield
43	Shield of wire 10 at P2	-	Shield of wire 9 at P2	-	Shield
44	Shield of wire 9 at P2	-	P2 (see wire 1)	23	Shield

TABLE 5-12. SPECIAL PURPOSE ELECTRICAL
CABLE ASSEMBLY, CX-10919/TYA-11, WIRE RUNNING LIST

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
1	P1 (mates with Radio Sets, AN/GRC-112 or AN/GRC-134)	1	P2 (mates with P1 on Radio Frequency FSK Modulator, ECI 03-01106-001, or Radio Frequency Oscillator, ECI 03-01166-001)	1	+28 vdc
2		2		2	FSK data (ECI 03-01106-001 only)
3		3		3	FSK data (ECI 03-01106-001 only)
4		4		4	FSK keying (ECI 03-01106-001 only)
5		5		5	FSK keying (ECI 03-01106-001 only)

TABLE 5-12. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
6		6		6	Xmtr keyline (ECI 03-01106-001 only)
7		7		7	+18 vdc reg in am. mode (ECI 03-01106-001 only)
8		8		8	Revr protect signal (ECI 03-01106-001 only)
9		9		9	-18 vdc in data mode (ECI 03-01106-001 only)
10		10		10	+28 vdc (ECI 03-01106-001 only)
11		11		11	Interlock (ECI 03-01106-001 only)
12		12		12	10 mcs
13		13	Shield of wire 12	-	Shield
14		14	P2 (see wire 1)	14	+18 vdc
15		15		15	
16	Shield of wires 2 and 3 at P1	-	Shield of wire 4 at P1	-	Shield
17	Shield of wires 2 and 3 at P2	-	Shield of wire 4 at P2	-	Shield
18	Shield of wire 4 at P1	-	Shield of wires 5 and 6 at P1	-	Shield
19	Shield of wire 4 at P2	-	Shield of wires 5 and 6 at P2	-	Shield
20	Shield of wires 5 and 6 at P1	-	Shield of wires 8 and 11 at P1	-	Shield
21	Shield of wires 5 and 6 at P2	-	Shield of wires 8 and 11 at P2	-	Shield
22	Shield of wires 8 and 11 at P1	-	Shield of wire 12 at P1	-	Shield
23	Shield of wires 8 and 11 at P2	-	Shield of wire 12 at P2	-	Shield
24	Shield of wire 12	-	P2 (see wire 1)	13	Shield

TABLE 5-13. SPECIAL PURPOSE ELECTRICAL
CABLE ASSEMBLY, CX-10918/TYA-11, WIRE RUNNING LIST

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
1	P1 (mates with Radio Sets, AN/GRC-112 or AN/GRC-134)	1	P2 (mates with Radio Frequency AM. Modulator, ECI 03-01069-003)	1	+18 vdc
2		2		2	Not used
3		3		3	Ground
4		4		4	
5		5		5	Audio

TABLE 5-13. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
6	P1 (Continued)	6	Shield of wire 5	6	Ground
7		7		-	Shield
8		8		8	Not used
9		9	P2 (see wire 1)	9	Audio
10		10	Shield of wires 9 and 11	-	Shield
11		11	P2 (see wire 1)	11	Audio
12		12		12	Not used
13		13		13	Not used
14		14		14	Audio
15		15		15	Audio
16	Shield of wire 4 at P1	-	Shield of wire 5 at P1	-	Shield
17	Shield of wire 4 at P2	-	Shield of wire 5 at P2	-	Shield
18	Shield of wire 5	-	P2 (see wire 1)	7	Shield
19	Shield of wires 9 and 11	-		10	Shield

TABLE 5-14. SPECIAL PURPOSE ELECTRICAL
CABLE ASSEMBLY, CX-10928/TYA-11, WIRE RUNNING LIST

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
1	P1 (mates with J2 on DC Power Supply, ECI 01-00509-001)	1	P2 (mates with P1 on Power Supply Subassembly, ECI 03-01390-001)	1	+12 vdc
2		9		9	+12 vdc
3		10		10	Ground
4		27		27	Ground
5		28		28	+26.5 vdc
6		36		36	+26.5 vdc

TABLE 5-15. SPECIAL PURPOSE ELECTRICAL
CABLE ASSEMBLY, CX-10929/TYA-11, WIRE RUNNING LIST

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
1	P1 (mates with P11 on cable W25 in Communications Central Group, AN/TYA-11)	A	P2 (mates with J1 on DC Power Supply, ECI 01-00509-001)	A	+26.5 vdc
2		B		B	+26.5 vdc
3		C		C	Ground
4		D		D	Ground
5		E		E	+12 vdc

TABLE 5-15. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
6 7 8 9 10	P1 (Continued)	F G H I J		F G H I J	+12 vdc 120v, 400 cps, phase C Neutral -12 vdc Chassis ground
11 12 13 14 15		K L M N P		K L M N P	+1.6 vdc +1.6 vdc +1.6 vdc +5.1 vdc 24 vac, 400 cps
16 17 18 19 20		R S T U V		R S T U V	14 vac, 400 cps 400 cps return 14 vac, 400 cps 24 vac, 400 cps

TABLE 5-16. BRANCHED SPECIAL PURPOSE ELECTRICAL
CABLE ASSEMBLY, CX-10930/TYA-11, WIRE RUNNING LIST

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
1 2 3 4 5	P1 (mates with P1 on W25 in Communica- tions Central Group, AN/TYA-11)	A B C D E	P6 (mates with J1 on Radio Set Control Assembly, ECI 01- 00507-001)	A B C D E	Radio 1 remote preset channel code Radio 1 remote preset channel code Radio 1 remote preset channel code Radio 1 remote preset channel code Radio 2 remote preset channel code
6 7 8 9 10		F G H I J		F G H I J	Radio 2 remote preset channel code Radio 2 remote preset channel code Radio 2 remote preset channel code Radio 3 remote preset channel code Radio 3 remote preset channel code

TABLE 5-16. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
11	P1 (Continued)	K	P6 (Continued)	K	Radio 3 remote preset channel code
12		L		L	Radio 3 remote preset channel code
13		M		M	Radio 4 remote preset channel code
14		N		N	Radio 4 remote preset channel code
15		O		O	Radio 4 remote preset channel code
16		P		P	Radio 4 remote preset channel code
17		R		R	Radio 1 remote audio Radio 1 remote audio Radio 2 remote audio
18		S		S	
19		T		T	
20		U		U	
21		V		V	Radio 2 remote audio
22		W		W	Radio 3 remote audio
23		X		X	Radio 3 remote audio
24		Y		Y	Radio 4 remote audio
25		Z		Z	Radio 4 remote audio
26		a		a	Radio 5 remote audio
27		b		b	Radio 5 remote audio
28		c		c	Radio 1 external phone audio
29		d		d	Radio 1 external phone audio
30		e		e	Radio 2 external phone audio
31		f		f	Radio 2 external phone audio
32		g		g	Radio 3 external phone audio
33		h		h	Radio 3 external phone audio
34		j		j	Radio 4 external phone audio
35		k		k	Radio 4 external phone audio
36	P2 (mates with P2 on W25 in Communications Central Group, AN/TYA-11)	m	P7 (mates with J2 on Radio Set Control Assembly, ECI 01-00507-001)	m	Radio 5 external phone audio
37		n		n	Radio 5 external phone audio
38		p		p	Radio 1 in use Radio 2 in use
39		A		A	
40		B		B	
41		C		C	Radio 3 in use
42		D		D	Radio 4 in use
43		E		E	Radio 5 in use
44		F		F	Ground
45		G		G	Radio Set Control Assembly power on

TABLE 5-16. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
46 47 48 49 50	P2 (Continued)	H	P7 (Continued)	H	Master reset
		J		J	Radio 1 external phone audio
		K		K	Radio 1 external phone audio
		L		L	Radio 2 external phone audio
		M		M	Radio 2 external phone audio
51 52 53 54 55		N		N	Radio 3 external phone audio
		P		P	Radio 3 external phone audio
		R		R	Radio 4 external phone audio
		S		S	Radio 4 external phone audio
		T		T	Radio 5 external phone audio
56 57 58 59 60	P3 (mates with P3 on W25 in Communications Central Group, AN/TYA-11)	U	P8 (mates with J3 on Radio Set Control Assembly, ECI 01-00507-001)	U	Radio 5 external phone audio
		V		V	
		W		W	Radio Set Control Assembly power on
		X		X	Radio Set Control Assembly power on
		A		A	Radio 1 remote audio in
61 62 63 64 65		B		B	Radio 1 remote audio in
		C		C	Radio 2 remote audio in
		D		D	Radio 2 remote audio in
		E		E	Radio 3 remote audio in
		F		F	Radio 3 remote audio in
66 67 68 69 70		G		G	Radio 4 remote audio in
		H		H	Radio 4 remote audio in
		J		J	Radio 5 remote audio in
		K		K	Radio 5 remote audio in
		L		L	Radio 1 remote audio out
71 72 73 74 75		M		M	Radio 1 remote audio out
		N		N	Radio 2 remote audio out
		P		P	Radio 2 remote audio out
		R		R	Radio 3 remote audio out
		S		S	Radio 3 remote audio out
76 77 78 79 80		T		T	Radio 4 remote audio out
		U		U	Radio 4 remote audio out
		V		V	Radio 5 remote audio out
		W		W	Radio 5 remote audio out
		X		X	Radio 1 xmtr keying

TABLE 5-16. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
81 82 83 84 85	P3 (Continued)	Z	P8 (Continued)	Z	Radio 1 xmtr keying return
		a		a	Radio 2 xmtr keying
		b		b	Radio 2 xmtr keying return
		c		c	Radio 3 xmtr keying
		d		d	Radio 3 xmtr keying return
86 87 88 89 90		e f g h j		e f g h j	Radio 4 xmtr keying Radio 4 xmtr keying return Radio 5 xmtr keying Radio 5 xmtr keying return
91 92 93 94 95	P4 (mates with P4 on W25 in Communica- tions Central Group, AN/TYA-11)	A B C D E	P9 (mates with J4 on Radio Set Control Assembly, ECI 01- 00507-001)	A B C D E	Radio 1 preset channel code Radio 1 preset channel code Radio 1 preset channel code Radio 1 preset channel code
96 97 98 99 100		F G H J K		F G H J K	Radio 2 preset channel code Radio 2 preset channel code Radio 2 preset channel code Radio 2 preset channel code
101 102 103 104 105		L M N P R		L M N P R	Radio 3 preset channel code Radio 3 preset channel code Radio 3 preset channel code Radio 3 preset channel code
106 107 108 109 110		S T U V W		S T U V	Radio 4 preset channel code Radio 4 preset channel code Radio 4 preset channel code Radio 4 preset channel code
111 112 113 114 115		X Z a b c		X Z a b c	Radio 1 out of service Radio 1 out of service return Radio 2 out of service Radio 2 out of service return Radio 3 out of service

TABLE 5-16. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
116 117 118 119 120	P4 (Continued) P5 (mates with P5 on W25 in Communications Central Group, AN/TYA-11)	d e f g A	P9 (Continued) P10 (mates with J5 on Radio Set Control Assembly, ECI 01-00507-001)	d e f g A	Radio 3 out of service return Radio 4 out of service Radio 4 out of service return +26.5 vdc
121 122 123 124 125		B C D E F		B C D E F	+26.5 vdc Ground Ground +12 vdc +12 vdc
126 127 128 129 130		G H I J		G H I J	Not used Ground Ground -12 vdc Ground
131 132 133 134		K L M N		K L M N	+1.6 vdc +1.6 vdc Timing pulses +5 vdc

TABLE 5-17. BRANCHED SPECIAL PURPOSE ELECTRICAL
CABLE ASSEMBLY, CX-10931/TYA-11, WIRE RUNNING LIST

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
1 2 3 4 5	P1 (mates with P6 on W25 in Communications Central Group, AN/TYA-11)	A B C D E	P6 (mates with J1 on Indicator Test Electrical Assembly, ECI 01-00508-001)	A B C D E	Radio Set Control Assembly power on Master reset Radio 1 data 1 Radio 1 data 2 Radio 2 data 1
6 7 8 9 10		F G H J K		F G H J K	Radio 2 data 2 Radio 3 data 1 Radio 3 data 2 Radio 4 data 1 Radio 4 data 2

TABLE 5-17. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
11 12 13 14 15	P1 (Continued)	L	P6 (Continued)	L	Radio 1 remote 1
		M		M	Radio 1 remote 2
		N		N	Radio 2 remote 1
		P		P	Radio 2 remote 2
		R		R	Radio 3 remote 1
16 17 18 19 20		S		S	Radio 3 remote 2
		T		T	Radio 4 remote 1
		U		U	Radio 4 remote 2
		V		V	Radio 5 power on
		W		W	Chassis ground
21 22 23 24 25		X		X	Radio 1 test 1
		Z		Z	Chassis ground
		a		a	Radio 2 test 1
		b		b	Chassis ground
		c		c	Radio 3 test 1
26 27 28 29 30		d		d	Chassis ground
		e		e	Radio 4 test 1
		f		f	Chassis ground
		g		g	Radio 5 test 1
		h		h	Chassis ground
31 32 33 34 35	P2 (mates with P7 on W25 in Communications Central Group, AN/TYA-11)	i	P7 (mates with J2 on Indicator Test Electrical Assembly, ECI 01-00508-001)	i	Chassis ground
		A		A	Data xmtr 1
		B		B	Data xmtr 2
		C		C	Data keyline 1
		D		D	Data keyline 2
36 37 38 39 40		E		E	Data rcvr 1
		F		F	Data rcvr 2
		L		L	Radio 1 test key 1
		M		M	Radio 1 test key 2
		N		N	Radio 2 test key 1
41 42 43 44 45		P		P	Radio 2 test key 2
		R		R	Radio 3 test key 1
		S		S	Radio 3 test key 2
		T		T	Radio 4 test key 1
		U		U	Radio 4 test key 2
46 47 48 49 50	Shield of wire 52 at P7 Shield of wire 52 at P7 Shield of wire 52 at P2	V	Shield of wire 53 at P7 P7 (see wire 32) Shield of wire 53 at P2	V	Radio 5 test key 1
		W		W	Radio 5 test key 2
		-		-	Shield
		-		Z	Ground
		-		-	Shield

TABLE 5-17. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
51 52 53 54 55	P2 (see wire 32)	Z a b c d	Shield of wire 52 at P2 P7 (see wire 32)	- a b c d	Ground Radio Set, AN/GRC-112, dummy load Radio Set, AN/GRC-134, dummy load Air conditioner 1 power on Air conditioner 2 power on
56 57 58 59 60	P3 (mates with P8 on W25 in Communica- tions Central Group, AN/TYA-11)	e f h A B	P8 (mates with J3 on Indicator Test Elec- trical Assembly, ECI 01-00508-001)	e f h A B	Ground Air conditioner malfunction Radio 1 xmtr connected Return for wires 59 and 61
61 62 63 64 65		C D E F G		C D E F G	Radio xmtr low power Radio 2 xmtr connected Return for wires 62 and 64 Radio 2 xmtr low power Radio 3 xmtr connected
66 67 68 69 70		H J K L M		H J K L M	Return for wires 65 and 67 Radio 3 xmtr low power Radio 4 xmtr connected Return for wires 68 and 70 Radio 4 xmtr low power
71 72 73 74 75		N P R S T		N P R S T	Radio 5 xmtr low power Ground Radio 1 rcvr connected Radio 1 rcvr connected return Radio 2 rcvr connected
76 77 78 79 80		U V W X Z		U V W X Z	Radio 2 rcvr connected return Radio 3 rcvr connected Radio 3 rcvr connected return Radio 4 rcvr connected Radio 4 rcvr connected return
81 82 83 84 85		a b c d e		a b c d e	Communications Central Group, AN/TYA-11 power on Timing line 1 Timing line 2 Timing line 3

TABLE 5-17. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
86 87 88 89 90	P3 (Continued) P4 (mates with P9 on W25 in Communica- tions Central Group, AN/TYA-11)	f g h m A	P8 (Continued) P9 (mates with J4 on Indicator Test Elec- trical Assembly, ECI 01-00508-001)	f g h m A	Timing line 4 Timing line 5 Timing line 6 Radio 1 xmtr data line 1
91 92 93 94 95		B C D E F		B C D E F	Radio 1 xmtr data line 2 Radio 2 xmtr data line 1 Radio 2 xmtr data line 2 Radio 3 xmtr data line 1 Radio 3 xmtr data line 2
96 97 98 99 100		G H J K -		G H J K -	Radio 4 xmtr data line 1 Radio 4 xmtr data line 2 Radio 1 rcvr data line 1 Radio 1 rcvr data line 2 Not used
101 102 103 104 105		L M N P R		L M N P R	Radio 2 rcvr data line 1 Radio 2 rcvr data line 2 Radio 3 rcvr data line 1 Radio 3 rcvr data line 2 Radio 4 rcvr data line 1
106 107 108 109 110		S T U V W		S T U V W	Radio 4 rcvr data line 2 Radio 1 data keyline 1 Radio 1 data keyline 2 Radio 2 data keyline 1 Radio 2 data keyline 2
111 112 113 114 115		X Z a b c		X Z a b c	Radio 3 data keyline 1 Radio 3 data keyline 2 Radio 4 data keyline 1 Radio 4 data keyline 2
116 117 118 119 120	P5 (mates with P10 on W25 in Communica- tions Central Group, AN/TYA-11)	A B C D E	P10 (mates with J5 on Indicator Test Elec- trical Assembly, ECI 01-00508-001)	A B C D E	Radio 1 keying voltage Radio 1 keying voltage Radio 2 keying voltage Radio 2 keying voltage Radio 3 keying voltage

TABLE 5-17. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
121 122 123 124 125	P5 (Continued)	F G H J K	P10 (Continued)	F G H J K	Radio 3 keying voltage Radio 4 keying voltage Radio 4 keying voltage Radio 5 keying voltage Radio 5 keying voltage
126 127 128 129 130		N P R S T		N P R S T	Radio 1 external phone audio Radio 1 external phone audio Radio 2 external phone audio Radio 2 external phone audio Radio 3 external phone audio
131 132 133 134 135		U V W X Z		U V W X Z	Radio 3 external phone audio Radio 4 external phone audio Radio 4 external phone audio Radio 5 external phone audio Radio 5 external phone audio
136 137 138 139 140		a g h j k		a g h j k	+26.5 vdc +26.5 vdc Ground Ground
141 142 143 144 145		m n p r s		m n p r s	+12 vdc +12 vdc -12 vdc Ground Ground

TABLE 5-18. BRANCHED SPECIAL PURPOSE ELECTRICAL
CABLE ASSEMBLY W1, ECI 12-01286-001, WIRE RUNNING LIST

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
1 2 3 4 5	P1 (mates with J1 on Test Set Coupler, MX-8154/TYA-11)	1 2 3 4 5	P11 (mates with J1 on Radio Set Control Assembly, ECI 01-00507-001)	A B C D E	Radio 1 remote preset channel code Radio 1 remote preset channel code Radio 1 remote preset channel code Radio 1 remote preset channel code Radio 2 remote preset channel code

TABLE 5-18. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
6	P1 (Continued)	6	P11 (Continued)	F	Radio 2 remote preset channel code
7		7		G	Radio 2 remote preset channel code
8		8		H	Radio 2 remote preset channel code
9		9		I	Radio 3 remote preset channel code
10		10		J	Radio 3 remote preset channel code
11		11		K	Radio 3 remote preset channel code
12		12		L	Radio 3 remote preset channel code
13		13		M	Radio 4 remote preset channel code
14		14		N	Radio 4 remote preset channel code
15		15		O	Radio 4 remote preset channel code
16		16		P	Radio 4 remote preset channel code
17		17		S	Radio 1 rcvr audio
18		18		T	Radio 1 rcvr audio
19		19		U	Radio 2 rcvr audio
20		20		V	Radio 2 rcvr audio
21		21		W	Radio 3 rcvr audio
22		22		X	Radio 3 rcvr audio
23		23		Y	Radio 4 rcvr audio
24		24		Z	Radio 4 rcvr audio
25		25		a	Radio 5 rcvr audio
26		26		b	Radio 5 rcvr audio
27		27		c	Grgund
28		28		d	Radio 1 external phone audio and keying ground
29		29		f	Radio 2 external phone audio and keying ground
30		30		g	Radio 3 external phone audio and keying ground

TABLE 5-18. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
31	P1 (Continued)	31	P11 (Continued)	k	Radio 4 external phone audio and keying ground
32		32		m	Ground
33		33		n	Radio 5 external phone audio and keying ground
34		34	P12 (mates with J2 on Radio Set Control Assembly, ECI 01-00507-001)	A	Radio 1 in use indicator ground
35		35		B	Radio 2 in use indicator ground
36		36		C	Radio 3 in use indicator ground
37		37		D	Radio 4 in use indicator ground
38		38		E	Radio 5 in use indicator ground
39		39		J	Radio 1 external phone audio and keying ground
40		40		K	Radio 1 external phone audio and keying ground
41		41		L	Radio 2 external phone audio and keying ground
42		42		M	Radio 2 external phone audio and keying ground
43		43		N	Radio 3 external phone audio and keying ground
44		44		P	Radio 3 external phone audio and keying ground
45		45		R	Radio 4 external phone audio and keying ground
46		46		S	Radio 4 external phone audio and keying ground
47		47		T	Radio 5 external phone audio and keying ground
48		48		U	Radio 5 external phone audio and keying ground
49		49		X	Remote power on return ground
50		-		-	Not used
51		-		-	Not used
52		-		-	Not used
53		-		-	Not used
54		-		-	Not used
55		-		-	Not used
56	P11 (see wire 1)	c	P11 (see wire 1)	e	Ground
57		e		g	Ground
58		g		j	Ground
59	P12 (see wire 34)	j	P12 (see wire 34)	m	Ground
60		G		W	Ground

TABLE 5-19. BRANCHED SPECIAL PURPOSE ELECTRICAL
CABLE ASSEMBLY W2, ECI 12-01287-001, WIRE RUNNING LIST

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
1 2 3 4 5	P2 (mates with J2 on Test Set Coupler, MX-8154/TYA-11)	1 2 3 4 5	P11 (mates with J1 on Indicator Test Elec- trical Assembly, ECI 01-00508-001)	B X a c e	Light test and master reset Radio 1 test status indicators Radio 2 test status indicators Radio 3 test status indicators Radio 4 test status indicators
6 7 8 9 10		6 7 8 9 10		g A B C D	Radio 5 test status indicator Data xmtr A Data xmtr B Data keyline A Data keyline B
11 12 13 14 15		11 12 13 14 15		E F L M N	Data rcvr A Data rcvr B Radio 1 test key A Radio 1 test key B Radio 2 test key A
16 17 18 19 20		16 17 18 19 20		P R S T U	Radio 2 test key B Radio 3 test key A Radio 3 test key B Radio 4 test key A Radio 4 test key B
21 22 23 24 25		21 22 23 24 25	P13 (mates with J3 on Indicator Test Elec- trical Assembly, ECI 01-00508-001)	V W a e S	Radio 5 test key A Radio 5 test key B Radio 1 thru 5 rf pwr meter test voltage Ground Light test and master reset
26 27 28 29 30		26 27 28 29 30		T b c d e	+26.5 vdc Radio Set Control Assembly timing pulses TOAC timing lines TOAC timing lines TOAC timing lines
31 32 33 34 35		31 32 33 34 35		f g h A B	TOAC timing lines TOAC timing lines TOAC timing lines Radios 1 thru 4 remote audio Radios 1 thru 4 remote audio

TABLE 5-19. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
36 37 38 39 40	P2 (Continued)	36 37 38 39 40	P13 (Continued)	N R T V g	Radio 1 external phone audio Radio 2 external phone audio Radio 3 external phone audio Radio 4 external phone audio
41 42 43 44 45		41 42 43 - -		j m p - -	Ground +12 vdc -12 vdc Not used Not used
46 47 48 49 50		- - - - -		- - - - -	Not used Not used Not used Not used Not used
51 52 53 54 55		- - - - 55	P11 (see wire 1)	- - - - Z	Not used Not used Not used Not used Ground
56 57 58 59 60	P11 (see wire 1)	T J R G N		U K S H P	
61 62 63 64 65		E L C Z A	P12 (see wire 7)	F M D Z c	Ground Air conditioner 1 power on
66 67 68 69 70	P12 (see wire 7)	V - c d f	P15 (see wire 34) P12 (see wire 7) P13 (see wire 25)	Z - d f a	Ground Not used Air conditioner 2 power on Air conditioner malfunction Communications Central Group, AN/TYA-11, power on
71 72 73 74 75	P13 (see wire 25)	b a B E U	P12 (see wire 7) P13 (see wire 25)	a B E U H	Radios 1 thru 5 rf pwr meter test voltage Light test and master reset Light test and master reset Light test and master reset Light test and master reset

TABLE 5-19. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
76 77 78 79 80	P13 (Continued)	H	P13 (Continued)	W	Light test and master reset
		W		L	Light test and master reset
		L		Z	Light test and master reset
		Z		N	Light test and master reset
		N		S	Light test and master reset
81 82 83 84 85		T		X	+26.5 vdc
		X		M	+26.5 vdc
		M		K	+26.5 vdc
		K		V	+26.5 vdc
		V		G	+26.5 vdc
86 87 88 89 90		G		J	+26.5 vdc
		J		F	+26.5 vdc
		F		D	+26.5 vdc
		D		R	+26.5 vdc
		R		C	+26.5 vdc
91 92 93 94 95	P15 (see wire 34)	C	P15 (see wire 34)	A	+26.5 vdc
		A		C	Radios 1 thru 4 remote audio
		C		E	Radios 1 thru 4 remote audio
		E		G	Radios 1 thru 4 remote audio
		B		D	Radios 1 thru 4 remote audio
96 97 98 99 100		D		F	Radios 1 thru 4 remote audio
		F		H	Radios 1 thru 4 remote audio
		V		W	Radio 4 external phone audio
		T		U	Radio 3 external phone audio
		R		S	Radio 2 external phone audio
101 102 103 104		N		P	Radio 1 external phone audio
		J		K	Radio 5 keying voltage
		X		j	Ground
		X		Z	Ground

TABLE 5-20. BRANCHED SPECIAL PURPOSE ELECTRICAL
CABLE ASSEMBLY W3, ECI 12-01288-001, WIRE RUNNING LIST

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
1 2 3 4 5	P3 (mates with J3 on Test Set Coupler, MX-8154/TYA-11)	1	P13 (mates with J3 on Radio Set Control Assembly, ECI 01-00507-001)	A	Radio 1 handset audio talk
		2		B	Ground
		3		C	Radio 2 handset audio talk
		4		E	Radio 3 handset audio talk
		5		G	Radio 4 handset audio talk

TABLE 5-20. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
6 7 8 9 10	P3 (Continued)	6 7 8 9 10	P13 (Continued)	J L N S T	Radio 5 handset audio talk Radio 1 rcvr and handset audio listen Radio 2 rcvr and handset audio listen Radio 3 rcvr and handset audio listen Radio 4 rcvr and handset audio listen
11 12 13 14 15		11 12 13 14 15		V X a c e	Radio 5 rcvr and handset audio listen Radio 1 xmtr keying Radio 2 xmtr keying Radio 3 xmtr keying Radio 4 xmtr keying
16 17 18 19 20		16 17 18 19 20	P14 (mates with J4 on Radio Set Control Assembly, ECI 01-00507-001)	g A B C D	Radio 5 xmtr keying Radio 1 local and remote pre-set channel code Radio 1 local and remote pre-set channel code Radio 1 local and remote pre-set channel code Radio 1 local and remote pre-set channel code
21 22 23 24 25		21 22 23 24 25		F G H J L	Radio 2 local and remote pre-set channel code Radio 2 local and remote pre-set channel code Radio 2 local and remote pre-set channel code Radio 2 local and remote pre-set channel code Radio 3 local and remote pre-set channel code
26 27 28 29 30		26 27 28 29 30		M N P S T	Radio 3 local and remote pre-set channel code Radio 3 local and remote pre-set channel code Radio 3 local and remote pre-set channel code Radio 4 local and remote pre-set channel code Radio 4 local and remote pre-set channel code

TABLE 5-20. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
31	P3 (Continued)	31	P14 (Continued)	U	Radio 4 local and remote pre-set channel code
32		32		V	Radio 4 local and remote pre-set channel code
33		33		X	Radio 1 out of service
34		34		Z	Ground
35		35		a	Radio 2 out of service
36		36		b	Ground
37		37		c	Radio 3 out of service
38		38		d	Ground
39		39		e	Radio 4 out of service
40		40		f	Ground
41		41	P15 (mates with J5 on Radio Set Control Assembly, ECI 01-00507-001)	A	+26.5 vdc
42		42		E	+12 vdc
43		43		I	-12 vdc
44		44		K	+1.6 vdc
45		45		M	Timing pulses
46		46	P16 (mates with J6 on Radio Set Control Assembly, ECI 01-00507-001)	N	+5 vdc
47		47		A	Handset audio listen
48		48		B	Ground
49		49		C	Handset audio talk and mike bias
50		50		E	Ground
51		51	P15 (see wire 41)	F	Handset audio talk and mike bias
52		52		H	Ground
53		-		-	Not used
54		-		-	Not used
55		55		J	Ground
56	P13 (see wire 1)	B	P13 (see wire 1)	D	Ground
57		D		F	Ground
58		F		H	Ground
59		H		K	Ground
60		K		M	Ground
61		M		P	Ground
62		P		R	Ground
63		R		U	Ground
64		U		W	Ground
65		W		Z	Ground

TABLE 5-20. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
66	P13 (Continued)	Z	P13 (Continued)	b	Ground
67		b		d	Ground
68		d		f	Ground
69		f		h	Ground
70	P15 (see wire 41)	h	P15 (see wire 41)	C	Ground
71		C		J	Ground

TABLE 5-21. BRANCHED SPECIAL PURPOSE ELECTRICAL
CABLE ASSEMBLY W4, ECI 12-01289-001, WIRE RUNNING LIST

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
1 thru 17 18 19 20	P4 (mates with J4 on Test Set Coupler, MX-8154/TYA-11)	-	P14 (mates with J4 on Indicator Test Elec- trical Assembly, ECI 01-00508-001)	-	Not used
		18		A	Radio 1 data xmtr A
		19		B	Radio 1 data xmtr B
		20		C	Radio 2 data xmtr A
21 22 23 24 25		21 22 23 24 25		D E F G H	Radio 2 data xmtr B Radio 3 data xmtr A Radio 3 data xmtr B Radio 4 data xmtr A Radio 4 data xmtr B
26 27 28 29 30		26 27 28 29 30		J K L M N	Radio 1 data rcvr A Radio 1 data rcvr B Radio 2 data rcvr A Radio 2 data rcvr B Radio 3 data rcvr A
31 32 33 34 35		31 32 33 34 35		P R S T U	Radio 3 data rcvr B Radio 4 data rcvr A Radio 4 data rcvr B Radio 1 data keyline A Radio 1 data keyline B
36 37 38 39 40 41		36 37 38 39 40 41		V W X Z a b	Radio 2 data keyline A Radio 2 data keyline B Radio 3 data keyline A Radio 3 data keyline B Radio 4 data keyline A Radio 4 data keyline B

TABLE 5-22. BRANCHED SPECIAL PURPOSE ELECTRICAL
CABLE ASSEMBLY W5, ECI 12-01290-001, WIRE RUNNING LIST

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
1 2 3 4 5	P4 (mates with J4 on Test Set Coupler, MX-8154/TYA-11)	1 2 3 4 5	P11 (mates with J1 on DC Power Supply, ECI 01-00509-001)	A B C E F	+26.5 vdc +26.5 vdc Ground +12 vdc +12 vdc
6 7 8 9 10		6 7 8 9 10		G H I K L	115 vac, 400 cps 115 vac, 400 cps -12 vdc +1.6 vdc +1.6 vdc
11 12 13 14 15 16		11 12 13 14 15 16		M N P R T U	+1.6 vdc +3.1 vdc 24 vac, 400 cps 14 vac, 400 cps 14 vac, 400 cps 24 vac, 400 cps

TABLE 5-23. BRANCHED SPECIAL PURPOSE ELECTRICAL
CABLE ASSEMBLY W6, ECI 12-01291-001, WIRE RUNNING LIST

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
1 2 3 4 5	P5 (mates with J5 on Test Set Coupler, MX-8154/TYA-11)	1 2 3 4 5	P17 (mates with J7 on Communications Central Group Con- trol, C-8019/ TYA-11)	B C D E F	Radio 1 xmtr audio Radio 2 xmtr audio Radio 1 xmtr audio Radio 2 xmtr audio Radio 4 xmtr audio
6 7 8 9 10		6 7 8 9 10		G H I J K	Radio 3 xmtr audio Radio 5 xmtr audio Radio 3 xmtr audio Radio 4 xmtr audio Radio 5 xmtr audio
11 12 13 14 15		11 12 13 14 15		L M N O P	Radio 1 remote in use grd Radio 2 remote in use grd Radio 3 remote in use grd Radio 4 remote in use grd Radio 5 remote in use grd

TABLE 5-23. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
16	P5 (Continued)	16	P17 (Continued)	S	Radio 1 remote preset channel code
17		17		T	Radio 1 remote preset channel code
18		18		U	Radio 1 remote preset channel code
19		19		V	Radio 1 remote preset channel code
20		20		W	Radio 2 remote preset channel code
21		21		X	Radio 2 remote preset channel code
22		22		Z	Radio 2 remote preset channel code
23		23		a	Radio 2 remote preset channel code
24		24		b	Radio 3 remote preset channel code
25		25		c	Radio 3 remote preset channel code
26		26		d	Radio 3 remote preset channel code
27		27		e	Radio 3 remote preset channel code
28		28		f	Radio 4 remote preset channel code
29		29		g	Radio 4 remote preset channel code
30		30		h	Radio 4 remote preset channel code
31		31		j	Radio 4 remote preset channel code
32		32		m	24 vac, 400 cps
33		33		n	Ground
34		34		p	12 vac, 400 cps
35		35		r	12 vac, 400 cps
36		36	P5 (see wire 1)	Z	24 vac, 400 cps
37		37		38	+26.5 vdc
38				.	Not used
39		39		A	Not used
40		40		B	+20 vdc
			P11 (mates with J1 thru J6 on Communications Central Group Control, C-8019/TYA-11)		

TABLE 5-23. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
41 42 43 44 45	P5 (Continued)	41 42 43 44 45	P11 (Continued) P12 (mates with J1 thru J6 on Communications Central Group Control, C-8019/TYA-11)	C E F H A	Ground Local and remote talk Not used PTT ground or +20 vdc Local and remote listen and ring signal
46 47 48 49 50		46 - - - -		B - - - -	Intercom lamp ground or +20 vdc Not used Not used Not used Not used
51 52 53 54 55		- - - - 55	P17 (see wire 1)	- - - - k	Not used Not used Not used Not used Ground

TABLE 5-24. BRANCHED SPECIAL PURPOSE ELECTRICAL
CABLE ASSEMBLY W7, ECI 12-01292-001, WIRE RUNNING LIST

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
1 2 3 4 5	P6 (mates with J6 on Test Set Coupler, MX-8154/TYA-11)	1 2 3 4 5	P11 (mates with J1 on Five Channel Audio Amplifier-Converter, ECI 01-00730-001)	A B C D E	Radio 1 remote audio Radio 1 remote audio Radio 1 xmtr key Radio 2 remote audio Radio 2 remote audio
6 7 8 9 10		6 7 8 9 10		F G H J K	Radio 2 xmtr key Radio 3 remote audio Radio 3 remote audio Radio 3 xmtr key Radio 4 remote audio

TABLE 5-24. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
11 12 13 14 15	P6 (Continued)	11 12 13 14 15	P11 (Continued)	L M N P R	Radio 4 remote audio Radio 4 xmtr key Radio 5 remote audio Radio 5 remote audio Radio 5 xmtr key
16 17 18 19 20		16 17 18 19 20		S T V W X	115 vac, 400 cps 115 vac, 400 cps Radio 1 external audio Radio 1 external audio Ground
21 22 23 24 25		21 22 23 24 25		Y Z b c e	Radio 2 external audio Radio 2 external audio Radio 3 external audio Radio 3 external audio Radio 4 external audio
26 27 28 29 30		26 27 28 29 30		f h i q t	Radio 4 external audio Radio 5 external audio Radio 5 external audio Relay 1 Relay 2
31 32 33 34 35		31 32 33 34 35	P12 (mates with J2 on Five Channel Audio Amplifier-Converter, ECI 01-00730-001)	u x y B C	Relay 3 Relay 4 Relay 5 Radio 1 xmtr audio +28 vdc
36 37 38 39 40		36 37 38 39 40		F G K L P	Radio 2 xmtr audio Radio 2 rcvr audio Radio 3 xmtr audio Radio 3 rcvr audio Radio 4 xmtr audio
41 42 43 44 45		41 42 43 44 45		R T U W X	Radio 4 xmtr audio Ground Radio 5 xmtr audio Radio 5 rcvr audio Radio 1 rcvr audio
46 47 48 49 50		46 47 48 49 50		Y b d g j	Radio 1 rcvr audio Radio 2 rcvr audio Radio 3 rcvr audio Radio 4 rcvr audio Radio 5 rcvr audio

TABLE 5-24. (Continued)

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
51 52 53 54 55	P6 (Continued)	- - - - -	P12 (Continued)	- - - - -	Not used Not used Not used Not used Not used
56 57 58 59 60	P11 (see wire 1)	X a d g j	P11 (see wire 1)	a d g j HH	Ground Ground Ground Ground Ground
61 62 63 64 65 66	P12 (see wire 34)	HH D A E J N	P12 (see wire 34)	D A E J N T	Ground Ground Ground Ground Ground Ground

TABLE 5-25. SPECIAL PURPOSE ELECTRICAL
CABLE ASSEMBLY W8, ECI 12-01303-001, WIRE RUNNING LIST

WIRE NO.	FROM		TO		FUNCTION
	CONNECTOR	PIN	CONNECTOR	PIN	
1 2	P1 (mates with J7 on Test Set Coupler, MX-8154/TYA-11)	1 3	P2 (mates with facility power connector)	A D	115 vac, 400 cps 115 vac, 400 cps

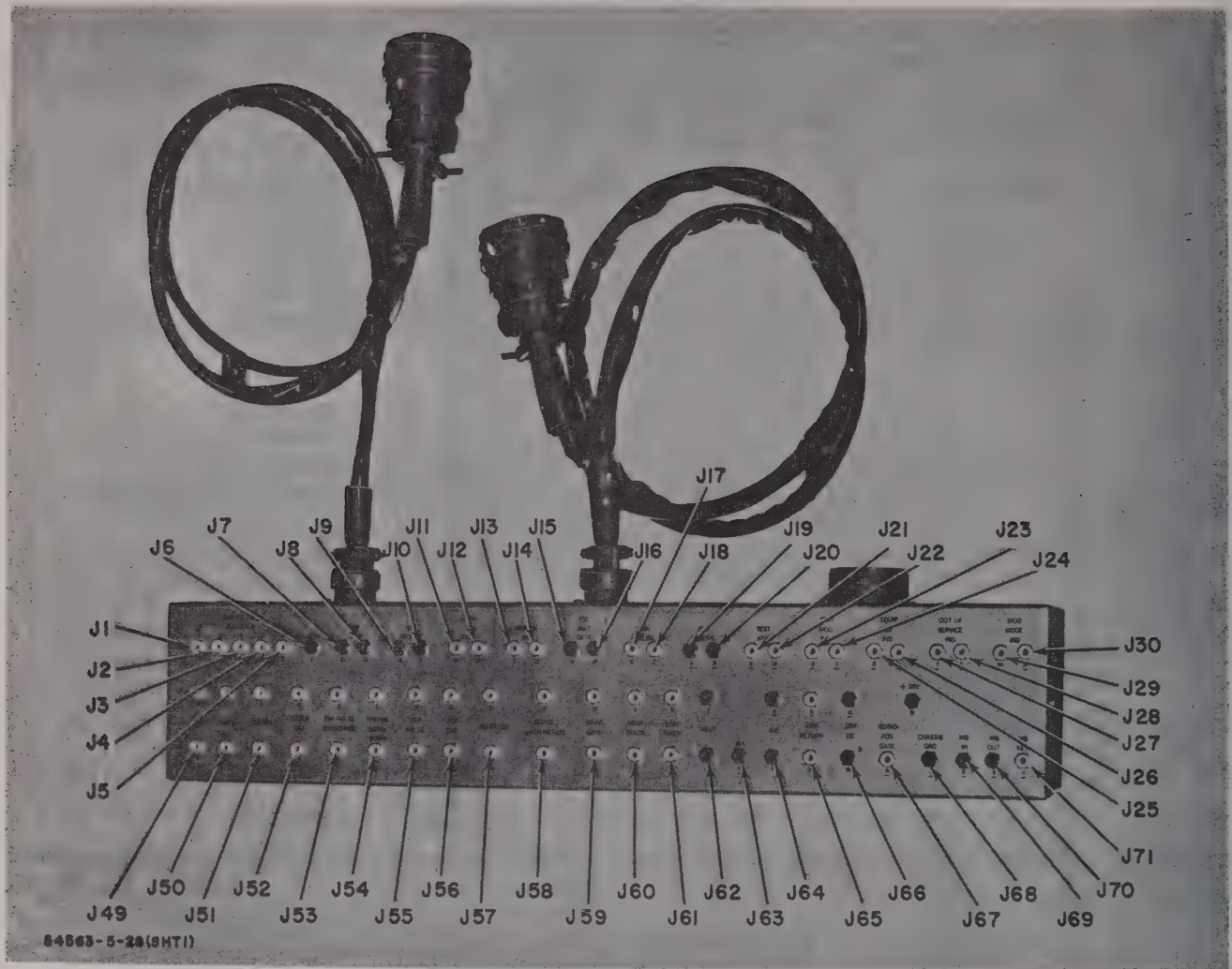


Figure 5-1. Test Adapter, MX-8150/TYA-11, Part Location (Sheet 1 of 2)

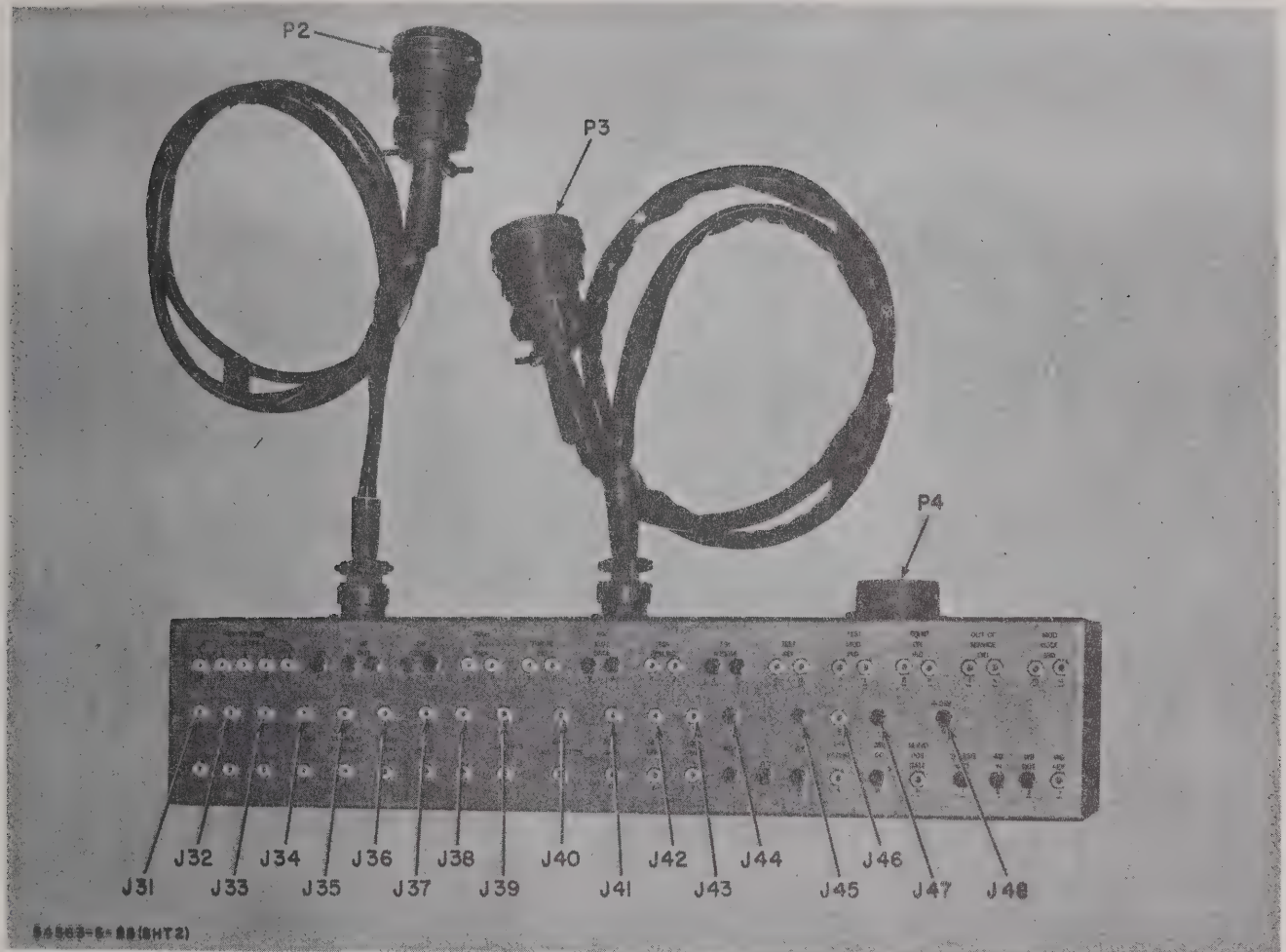


Figure 5-1. Test Adapter, MX-8150/TYA-11, Part Location (Sheet 2 of 2)

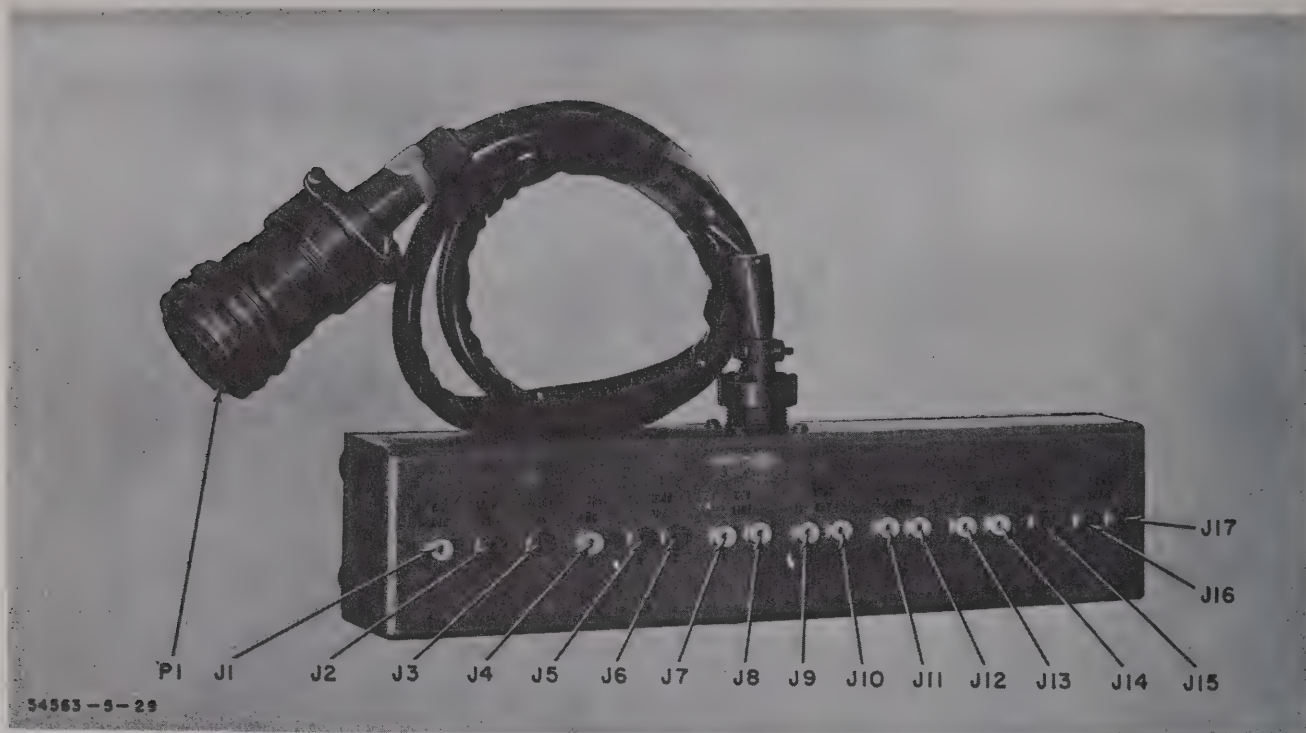


Figure 5-2. Test Adapter, MX-8151/TYA-11, Part Location

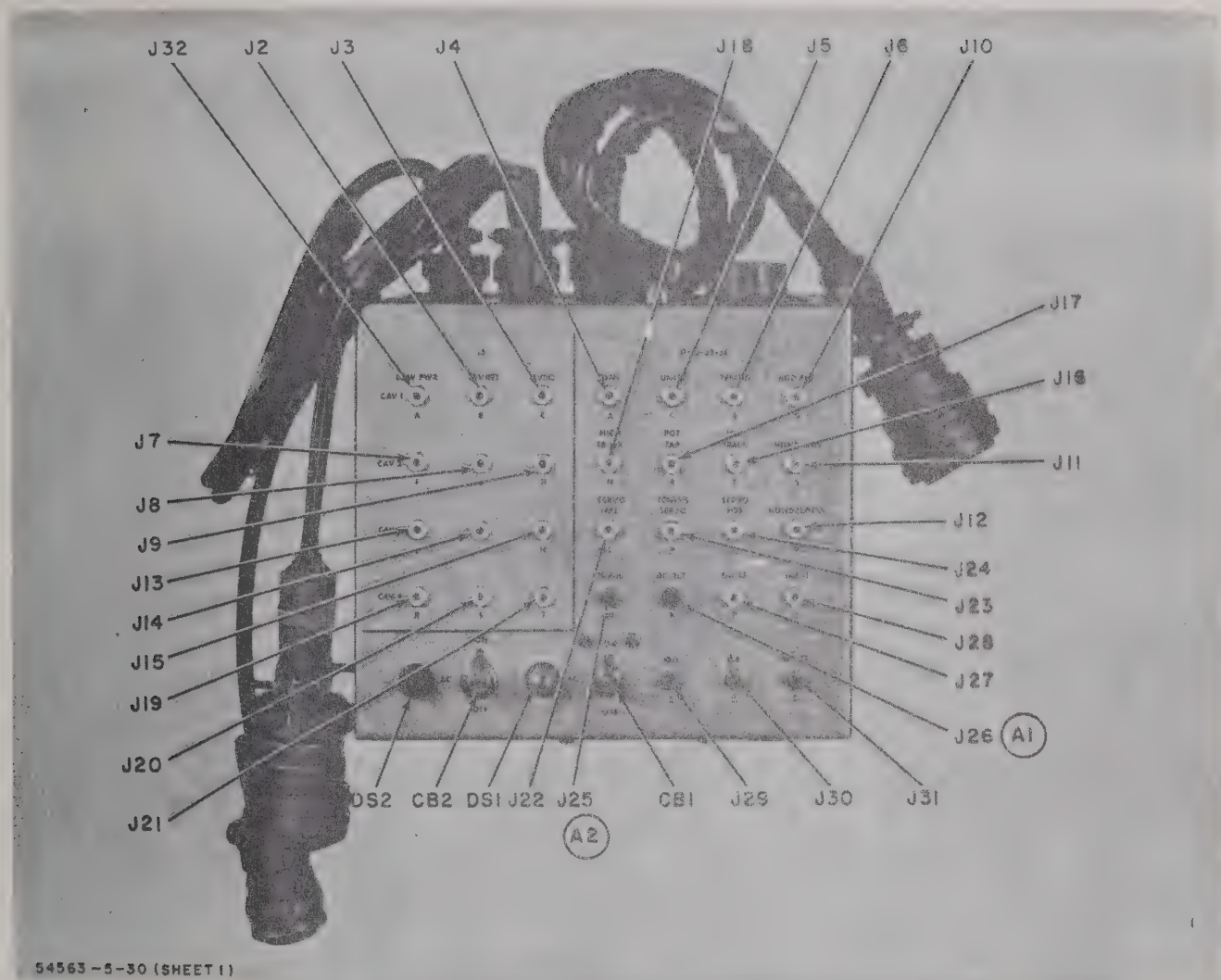


Figure 5-3. Test Adapter, MX-8152/TYA-11, Part Location (Sheet 1 of 2)

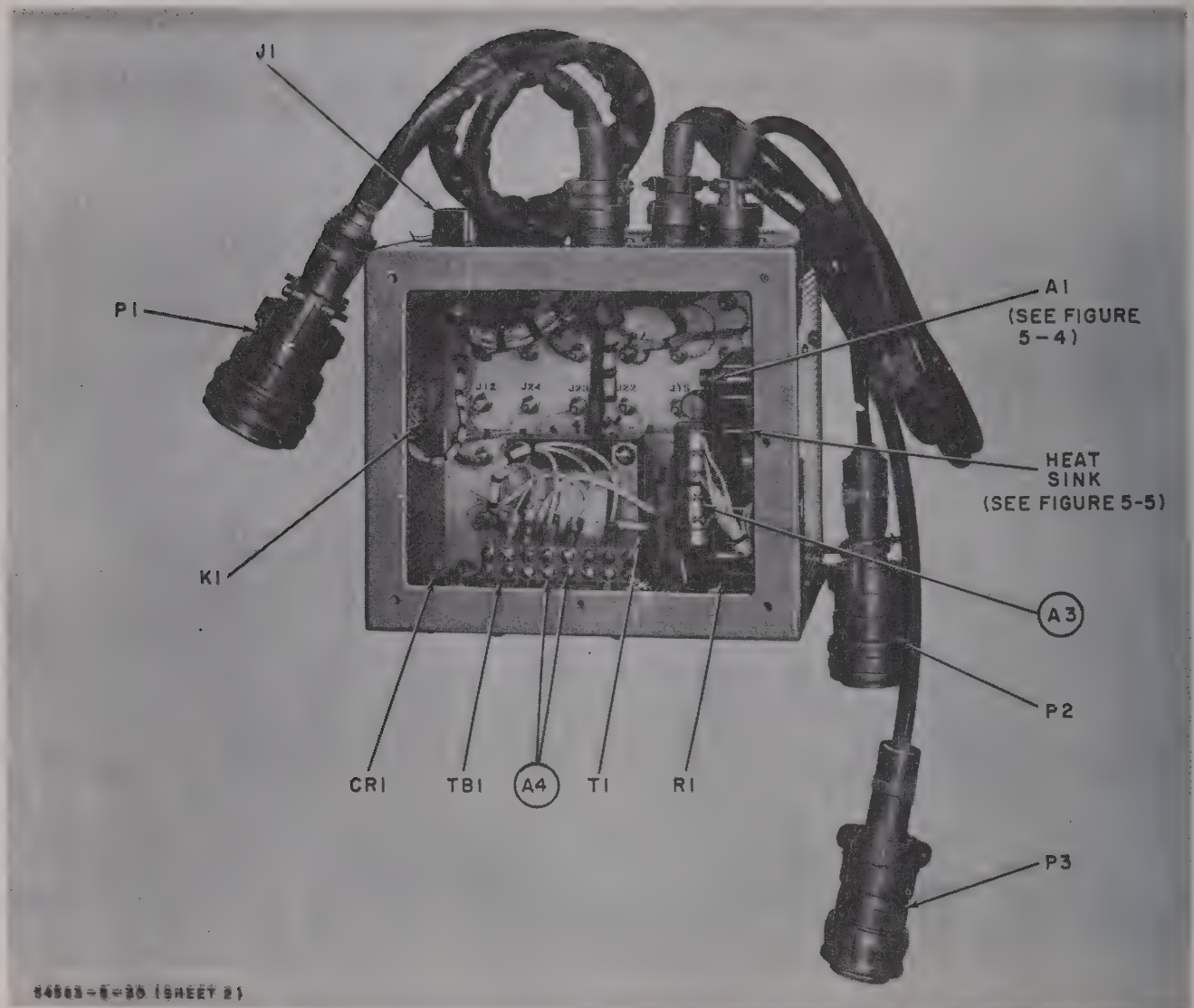


Figure 5-3. Test Adapter, MX-8152/TYA-11, Part Location (Sheet 2 of 2)

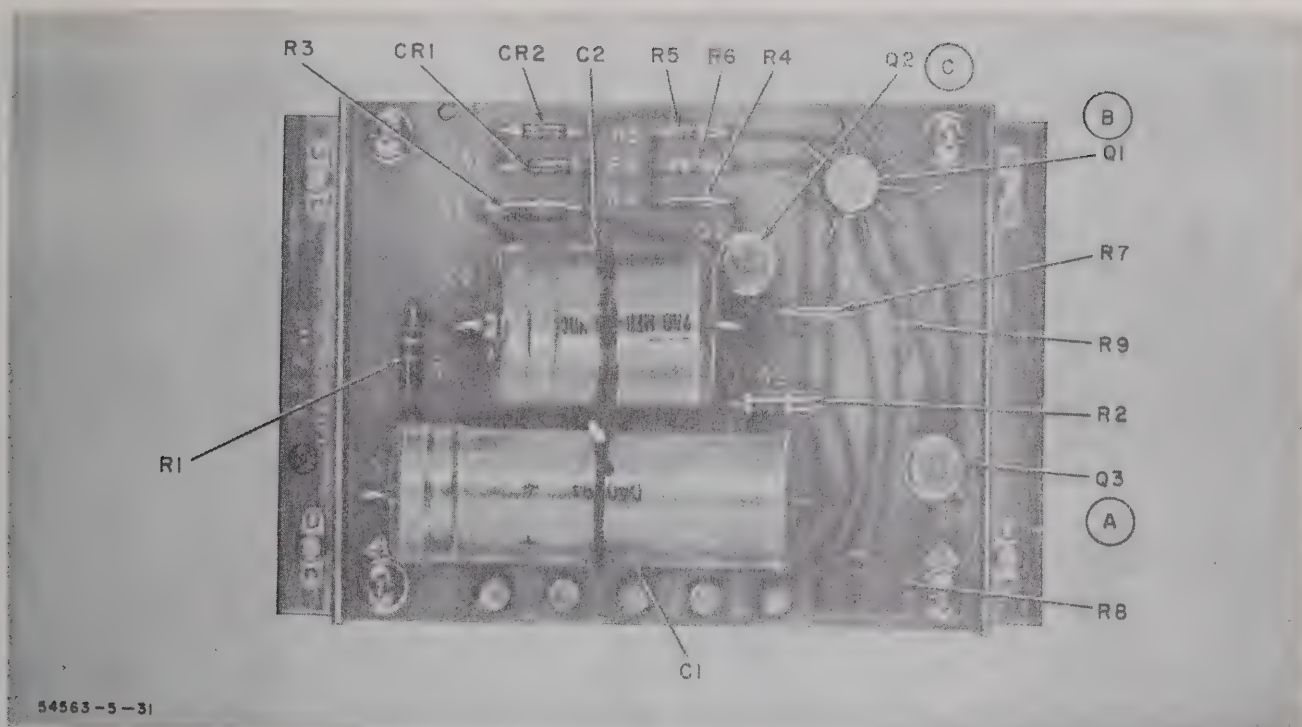


Figure 5-4. +28-Volt Regulator,Printed Wiring Board A1, ECI 61-00929-001, Part Location

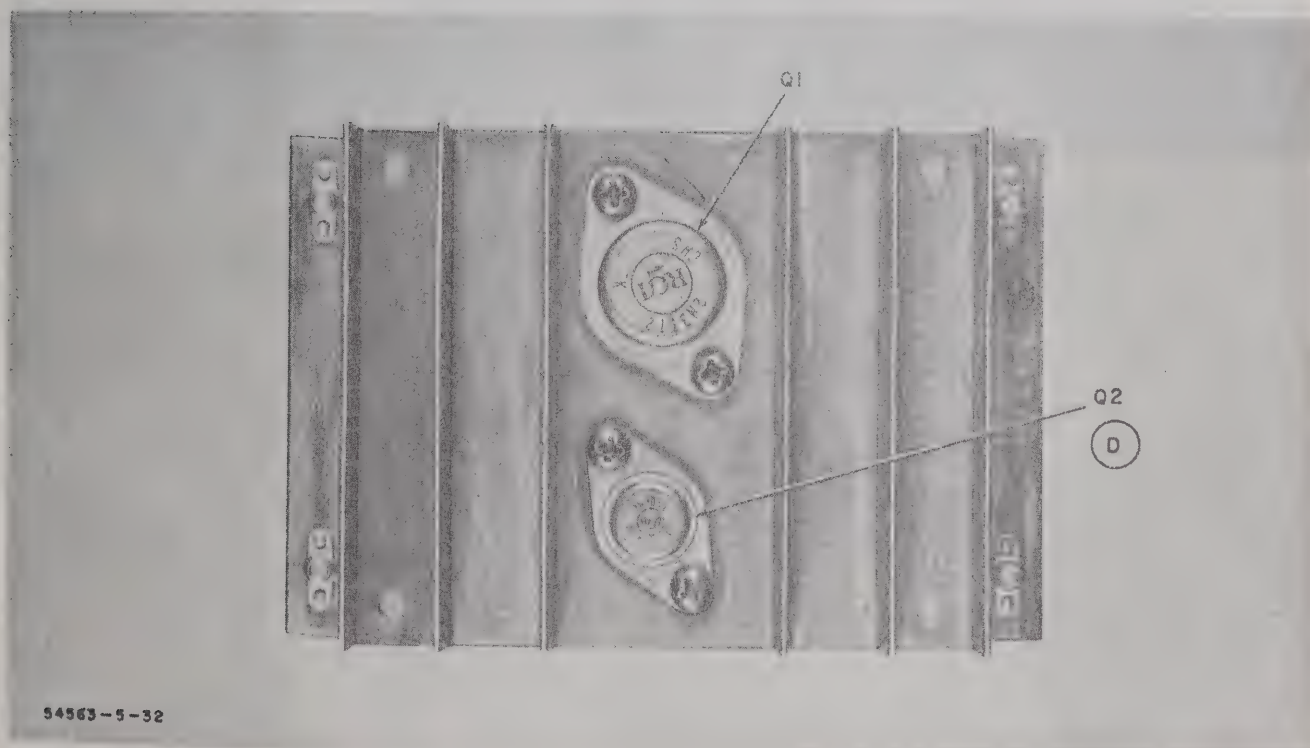


Figure 5-5. Heat Sink, ECI 67-02324-001, Part Location

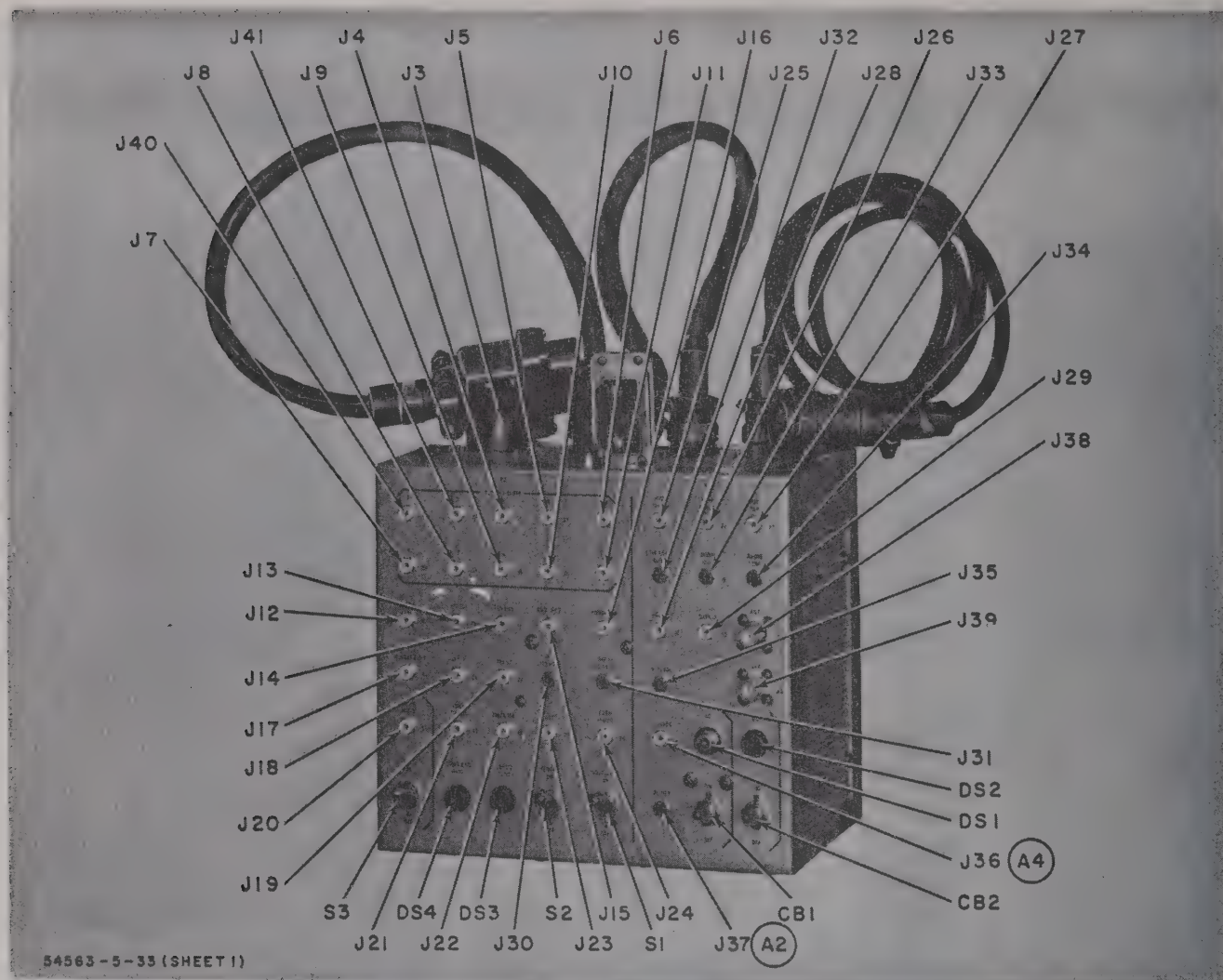


Figure 5-6. Test Set Coupler, MX-8153/TYA-11, Part Location (Sheet 1 of 2)

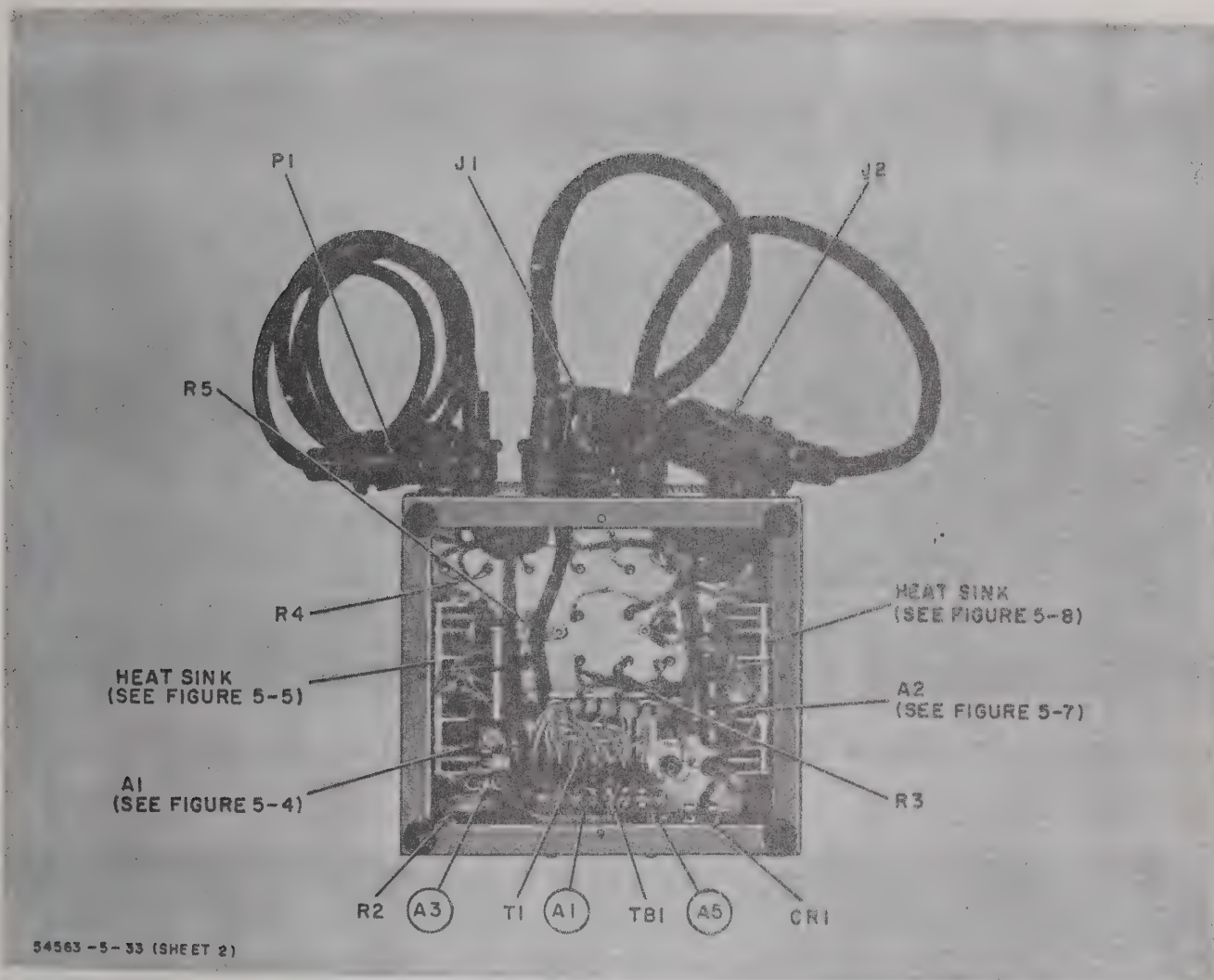


Figure 5-6. Test Set Coupler, MX-8153/TYA-11, Part Location (Sheet 2 of 2)

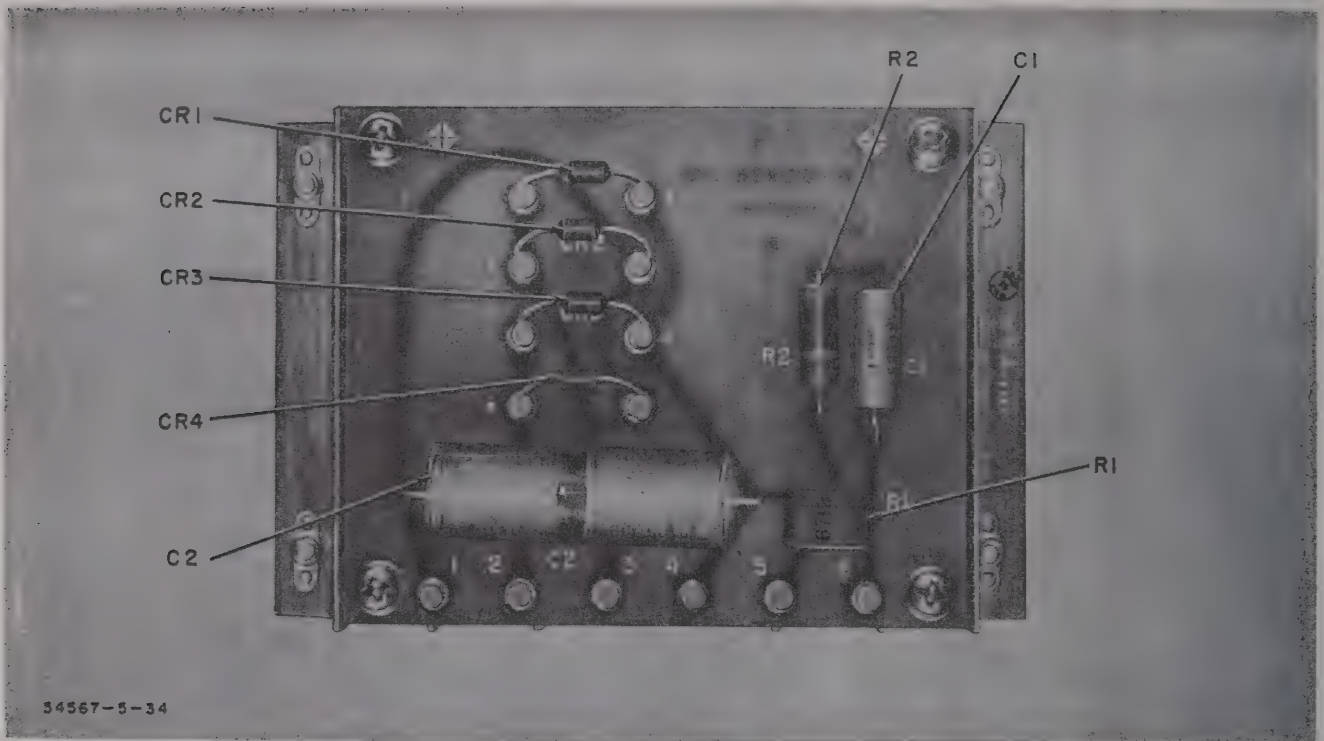


Figure 5-7. 18/28-Volt Power Supply, Printed Wiring Board A2, ECI 61-00928-001, Part Location

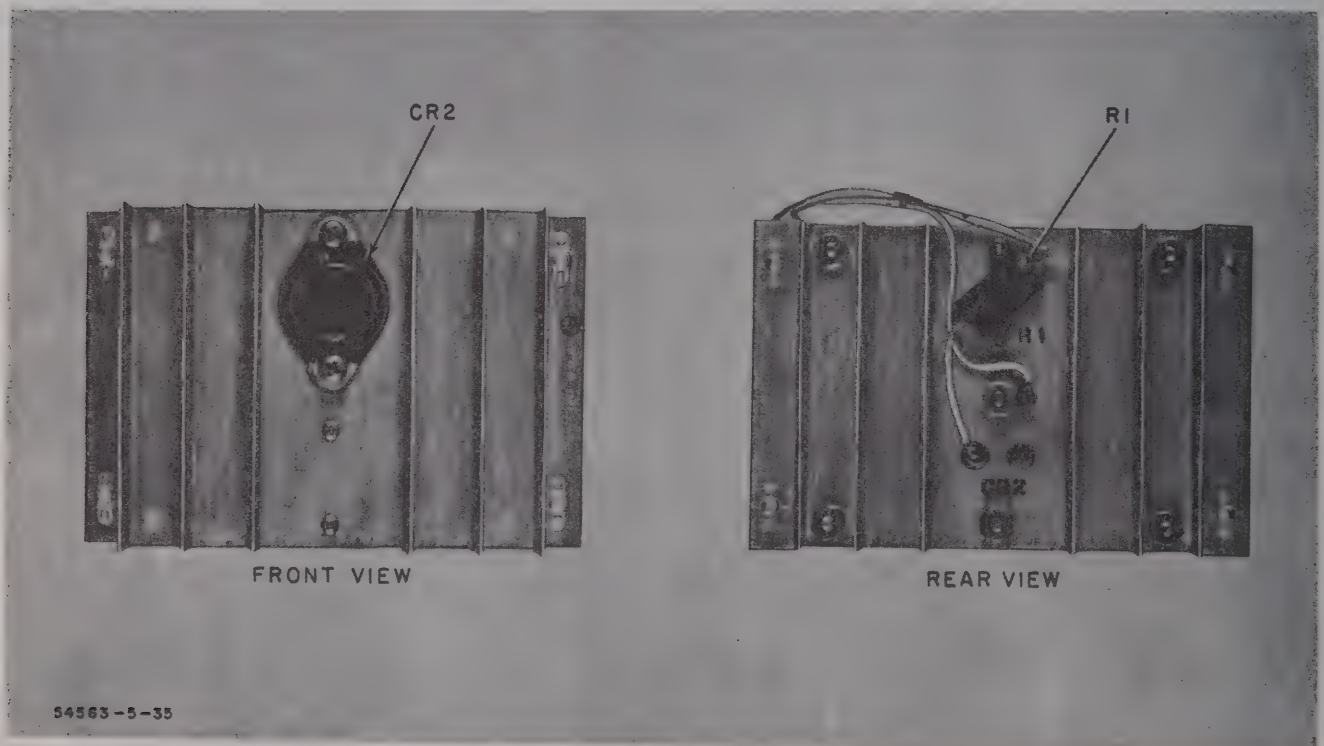


Figure 5-8. Heat Sink, ECI 67-02325-001, Part Location

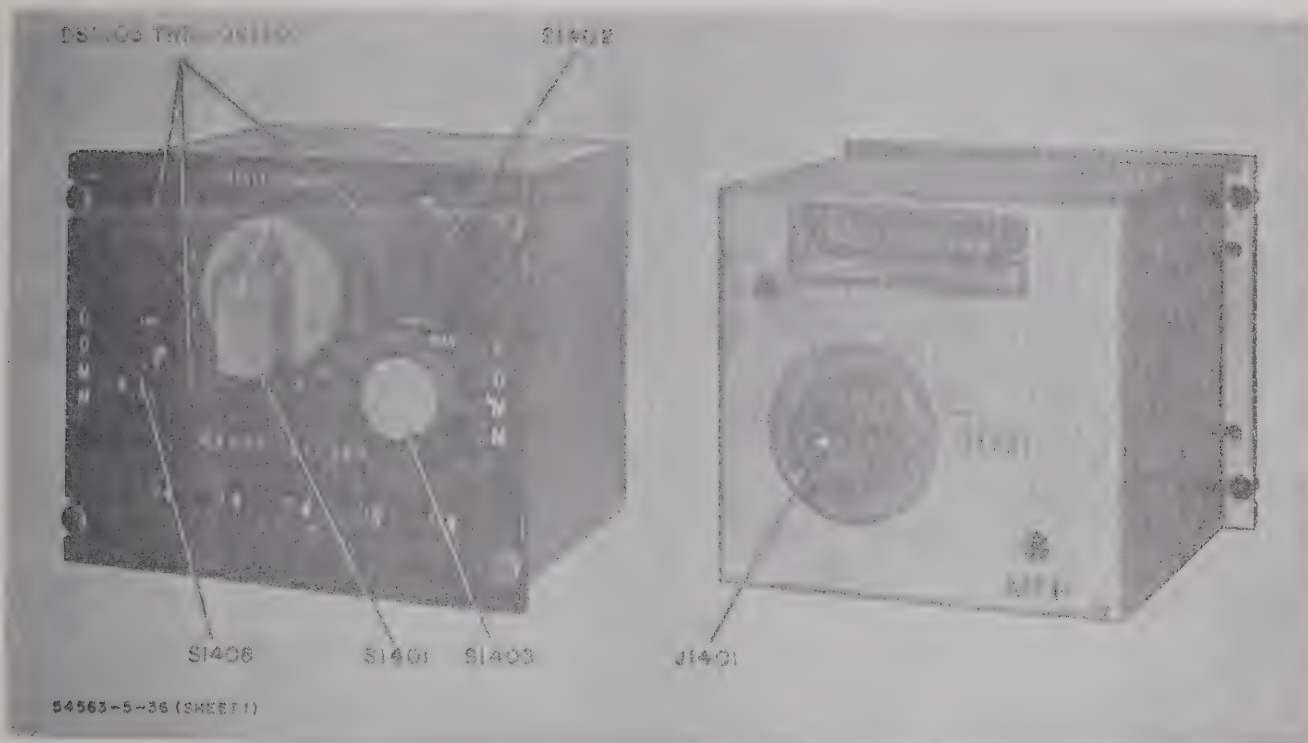


Figure 5-9. Radio Set Control, C-3811/AR, Part Location (Sheet 1 of 2)

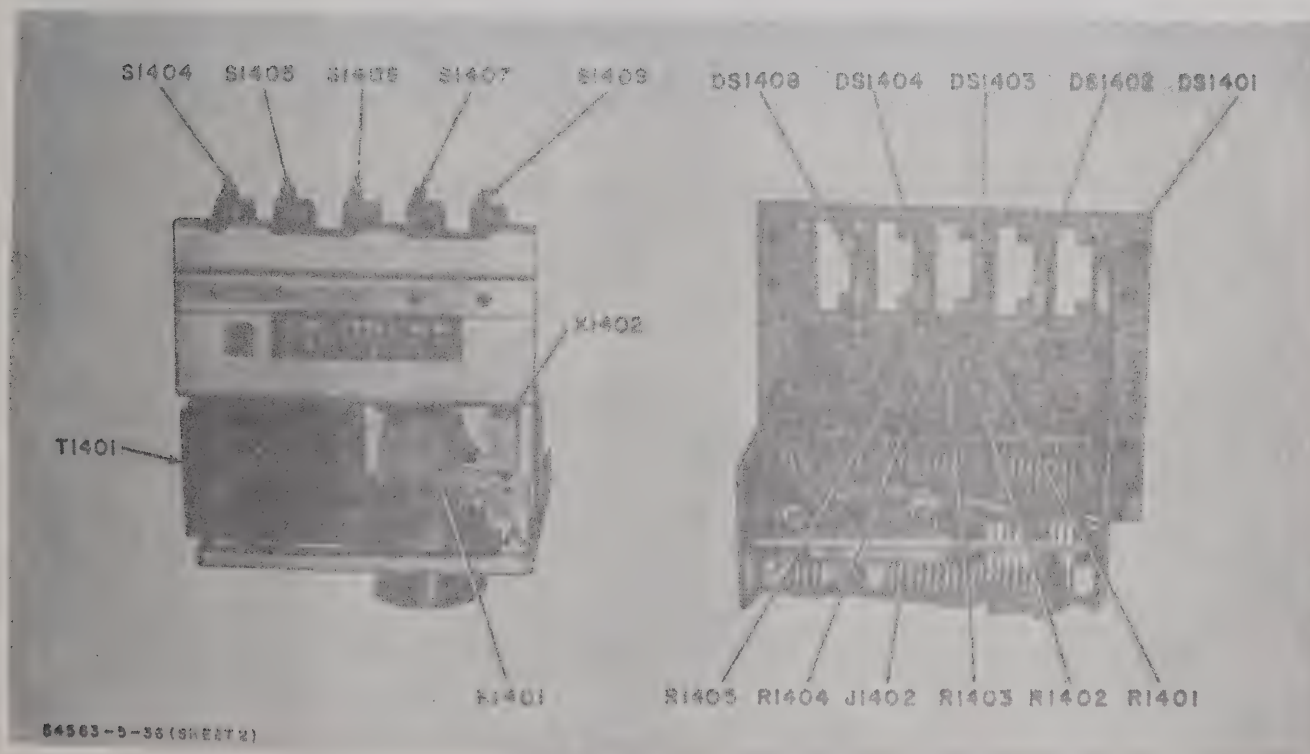


Figure 5-9. Radio Set Control, C-3811/AR, Part Location (Sheet 2 of 2)

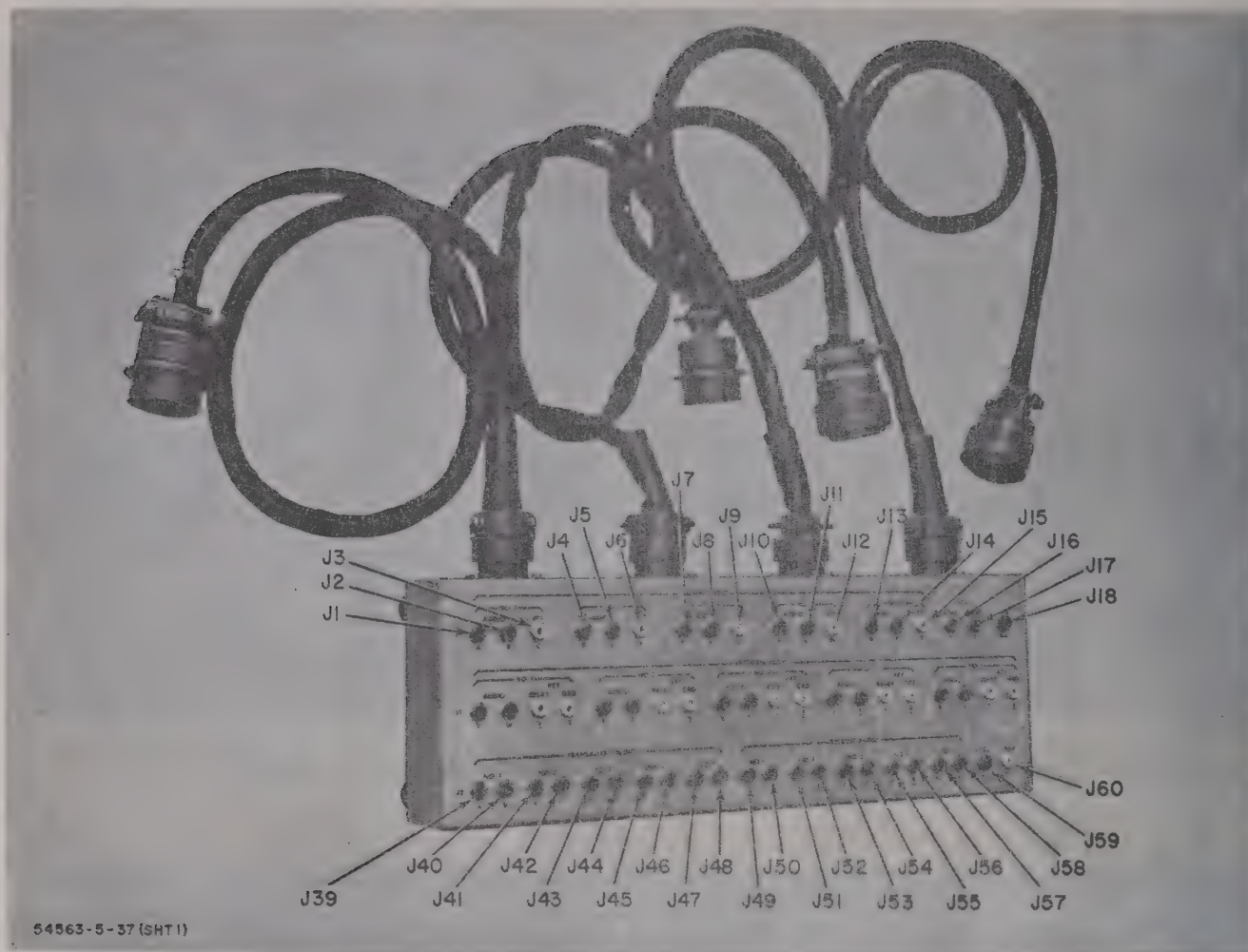


Figure 5-10. Test Adapter, MX-8158/TYA-11, Part Location (Sheet 1 of 2)

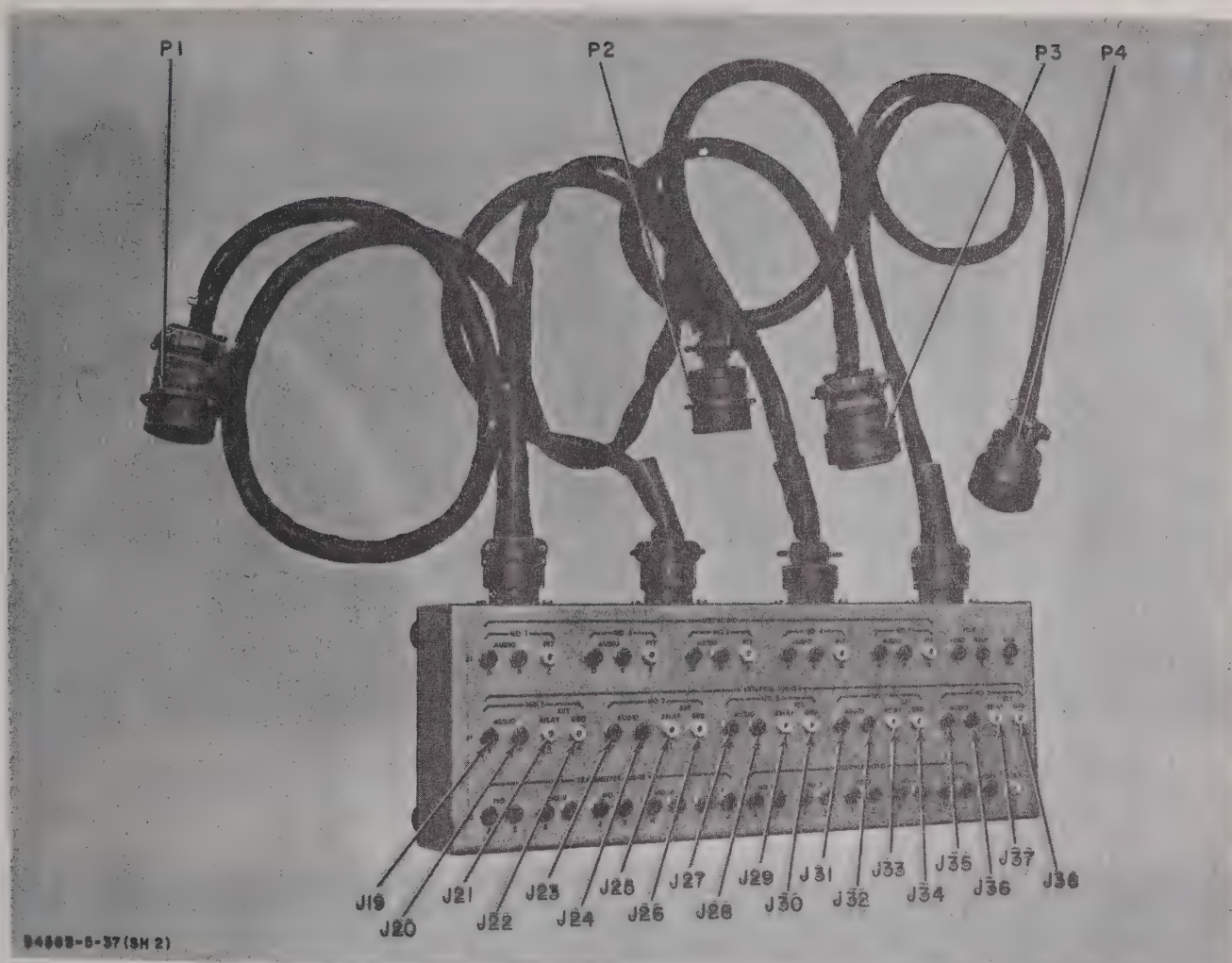
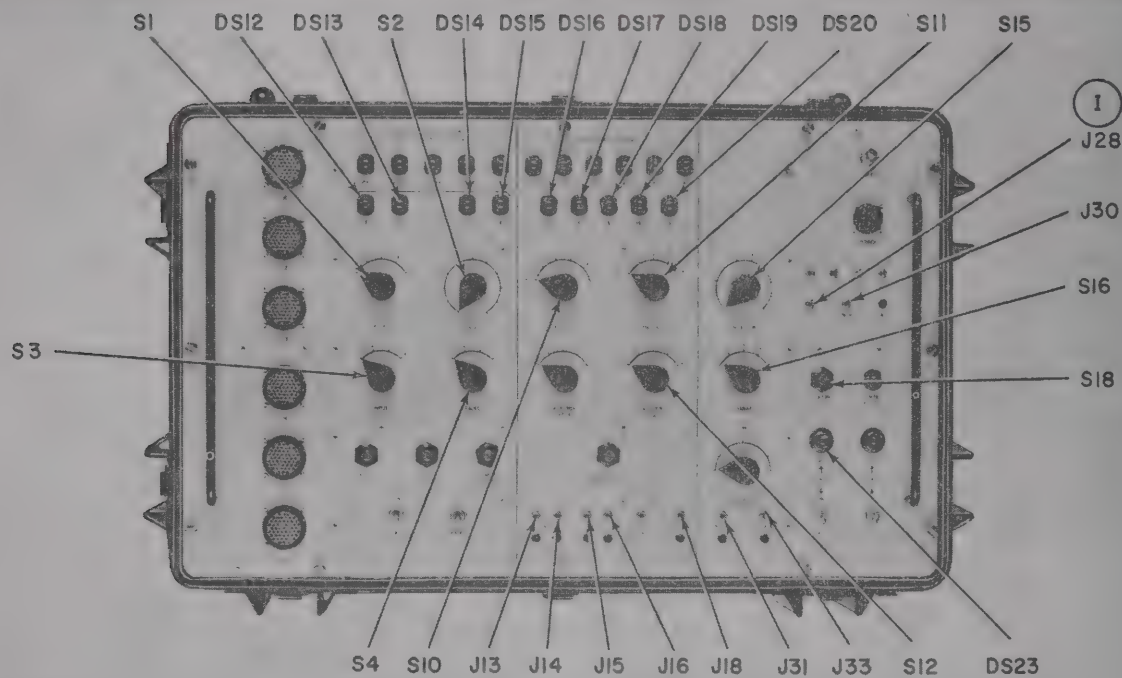
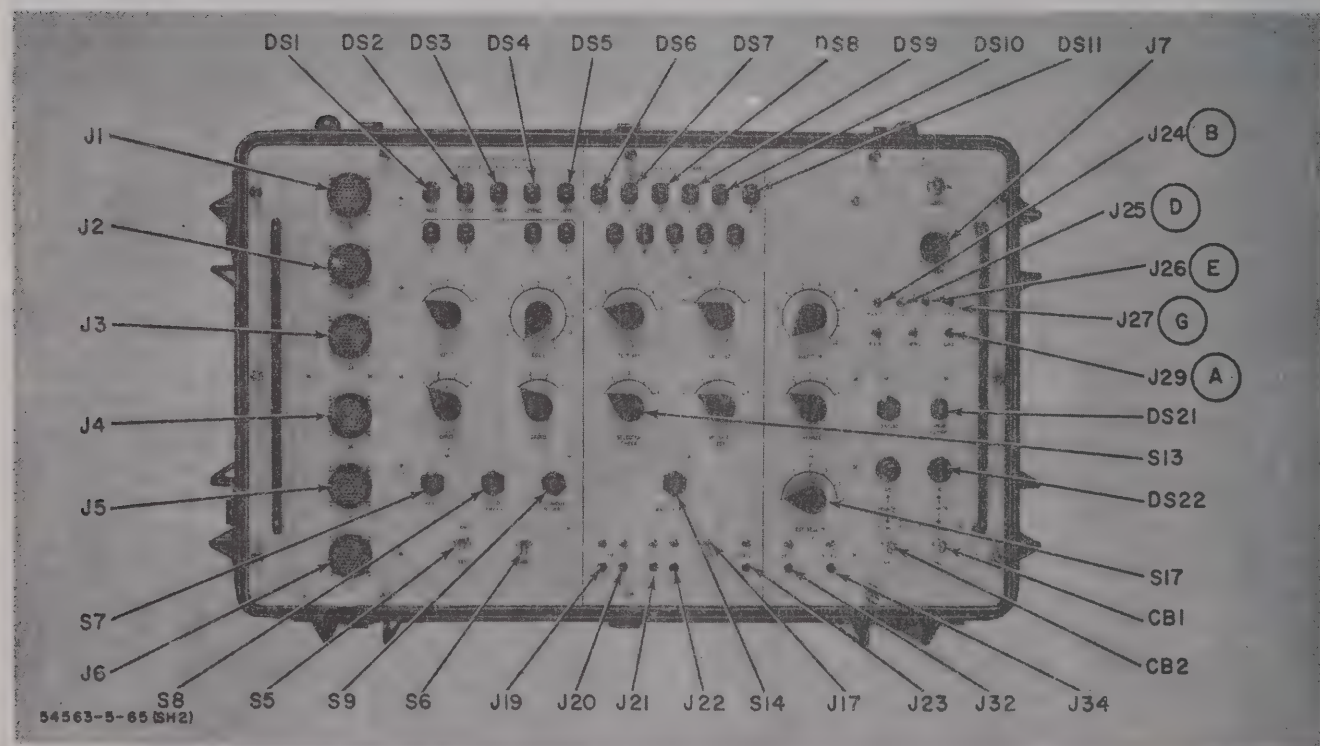


Figure 5-10. Test Adapter, MX-8158/TYA-11, Part Location (Sheet 2 of 2)



54563-5-65 (SH1)

Figure 5-11. Test Set Coupler, MX-8154/TYA-11, Part Location (Sheet 1 of 5)



54563-5-65 (SH2)

Figure 5-11. Test Set Coupler, MX-8154/TYA-11, Part Location (Sheet 2 of 5)

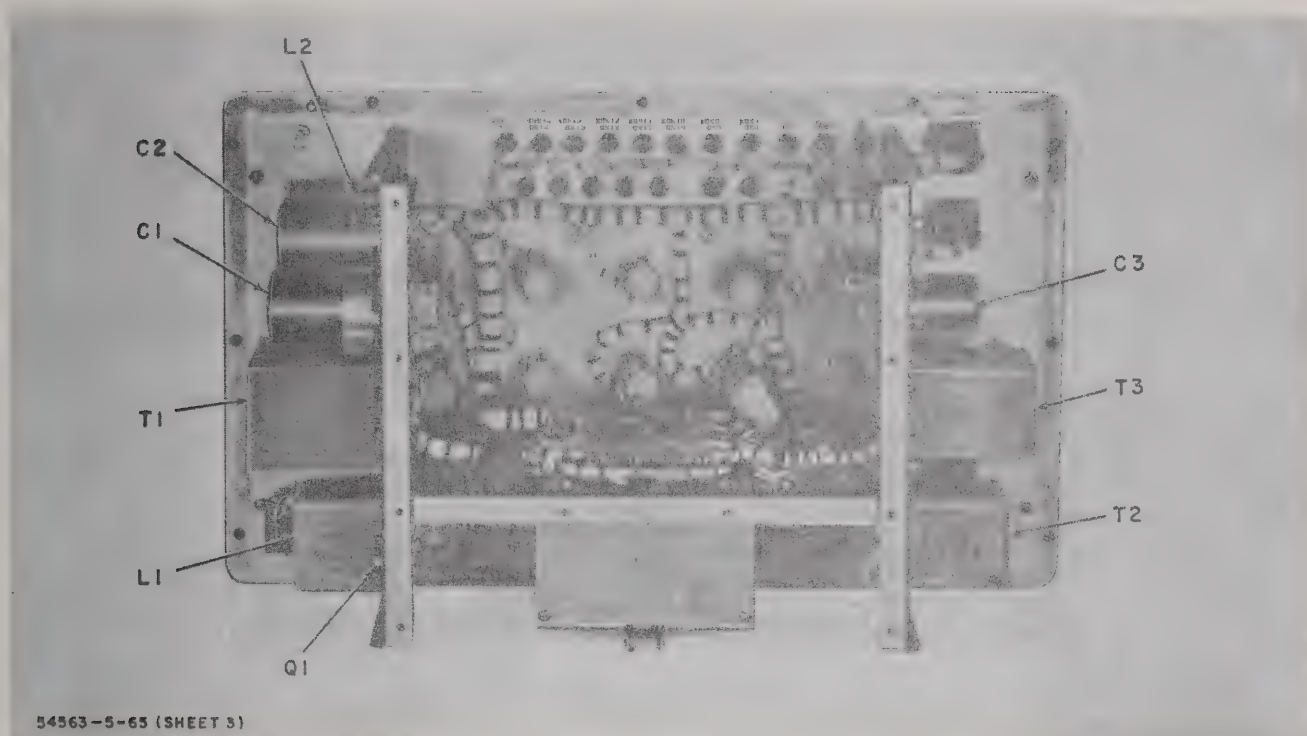


Figure 5-11. Test Set Coupler, MX-8154 TYA-11. Part Location (Sheet 3 of 5)

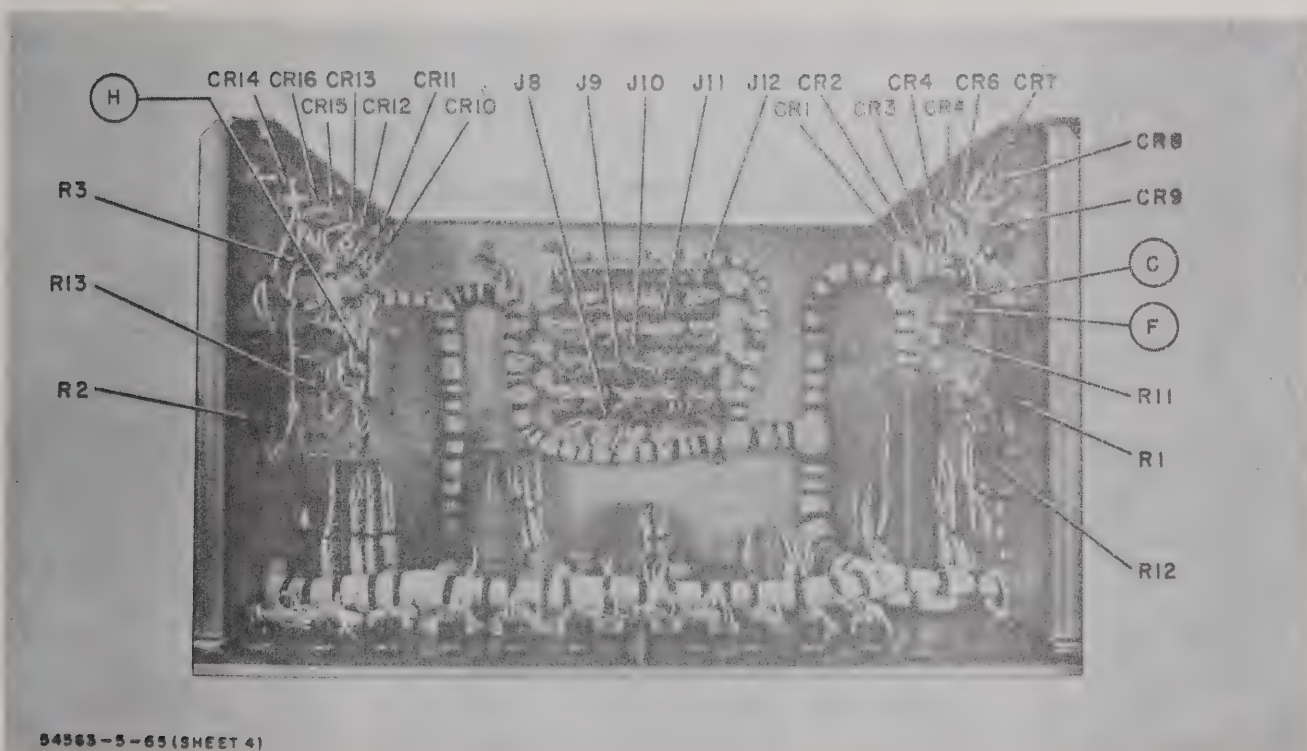


Figure 5-11. Test Set Coupler, MX-8154/TYA-11. Part Location (Sheet 4 of 5)

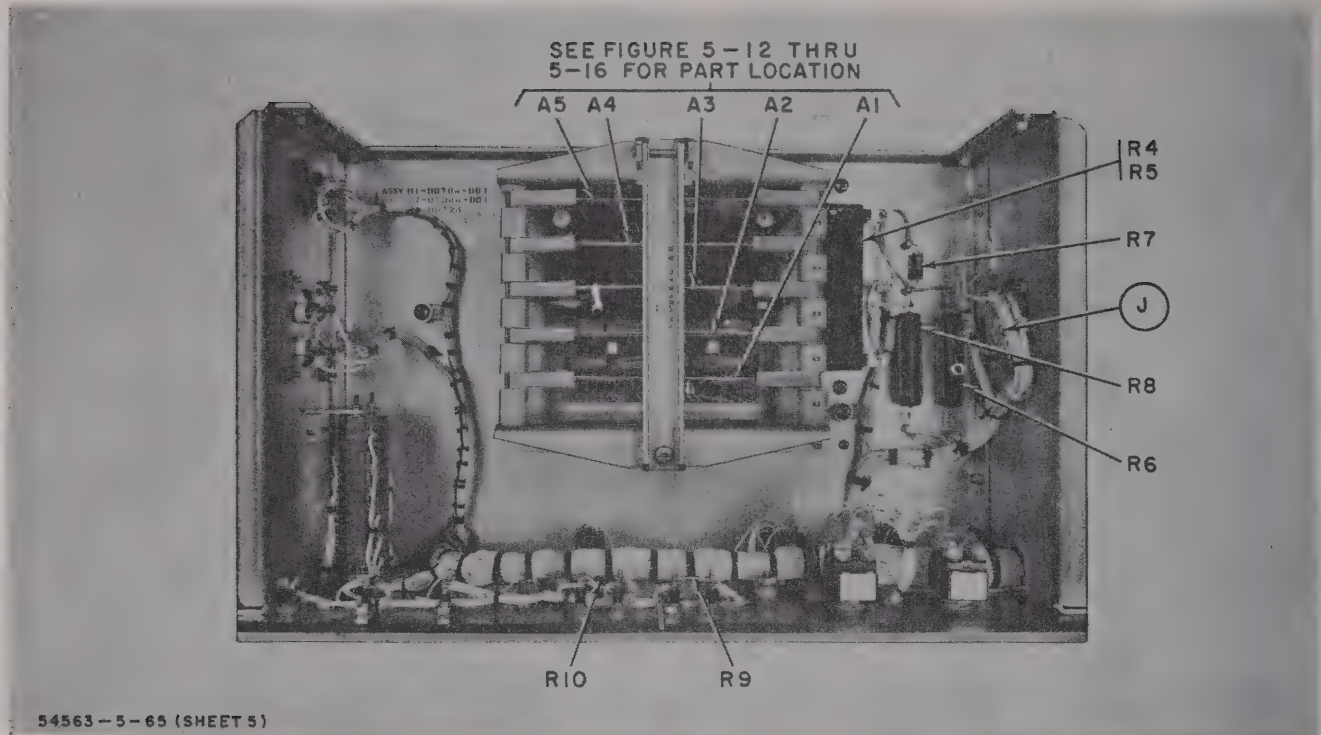


Figure 5-11. Test Set Coupler, MX-8154/TYA-11, Part Location (Sheet 5 of 5)

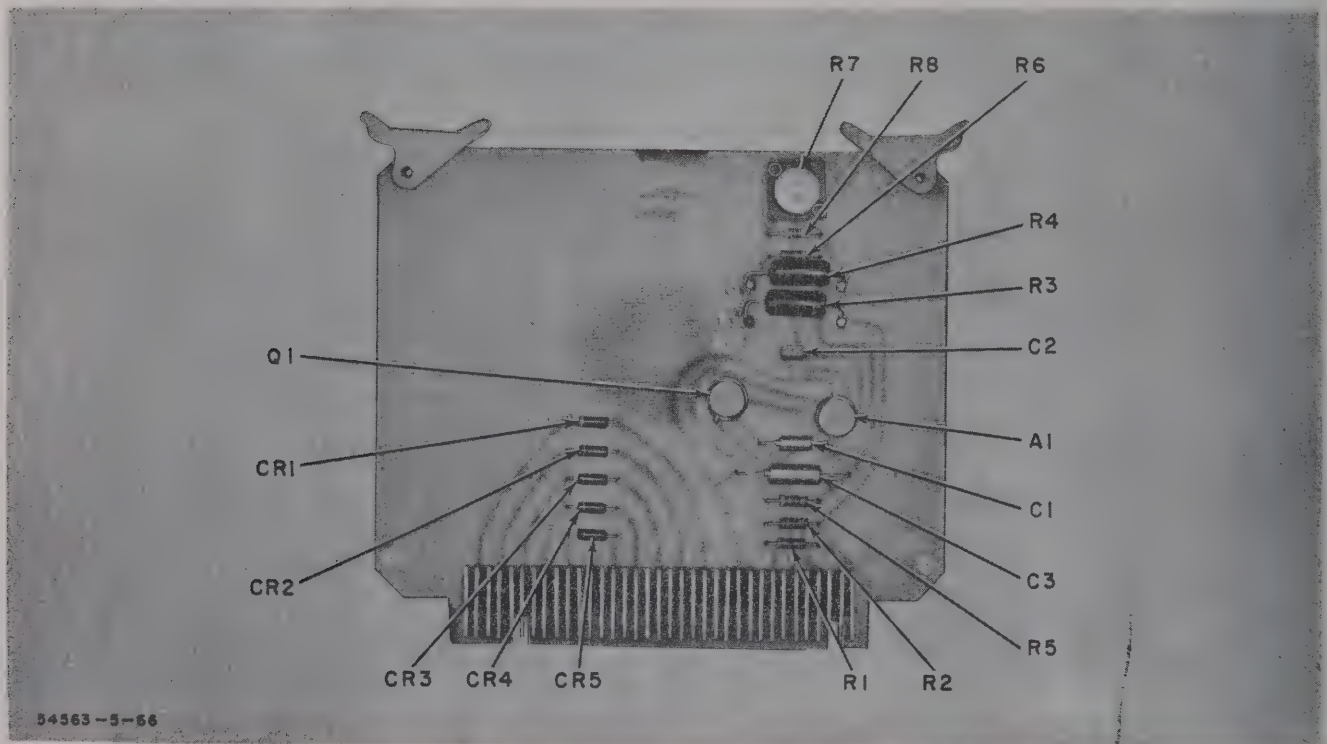


Figure 5-12. +12-Volt Regulator Printed Wiring Board A1, ECI 61-00967-001, Part Location

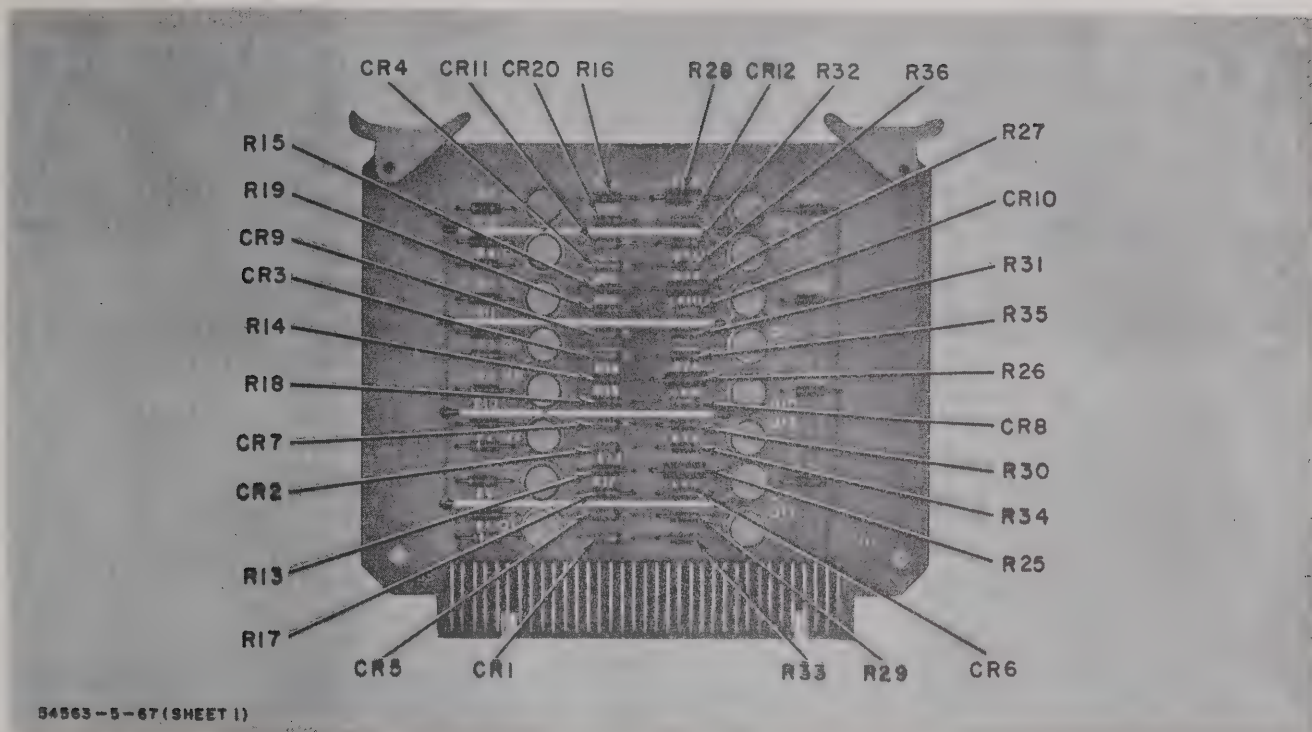


Figure 5-13. Light Drivers Printed Wiring Board A2, ECI 61-00943-001, Part Location (Sheet 1 of 2)

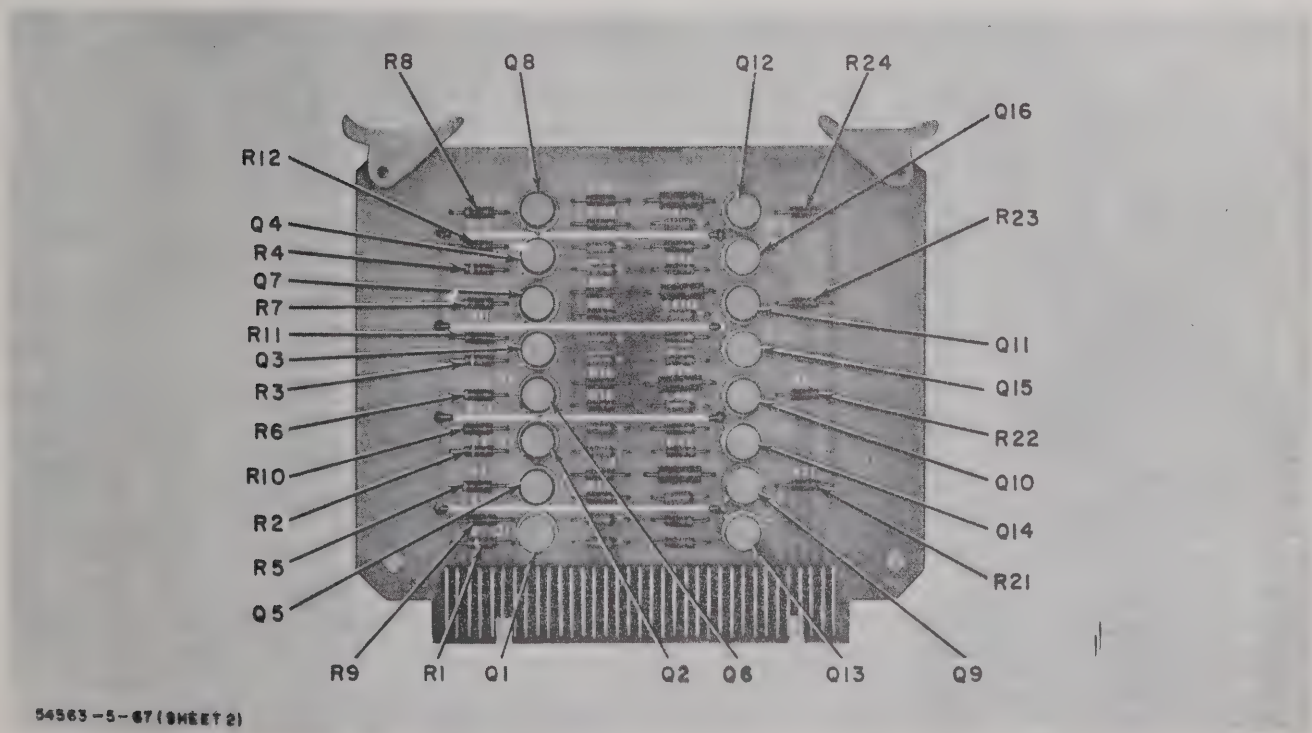


Figure 5-13. Light Drivers Printed Wiring Board A2, ECI 61-00943-001, Part Location (Sheet 2 of 2)

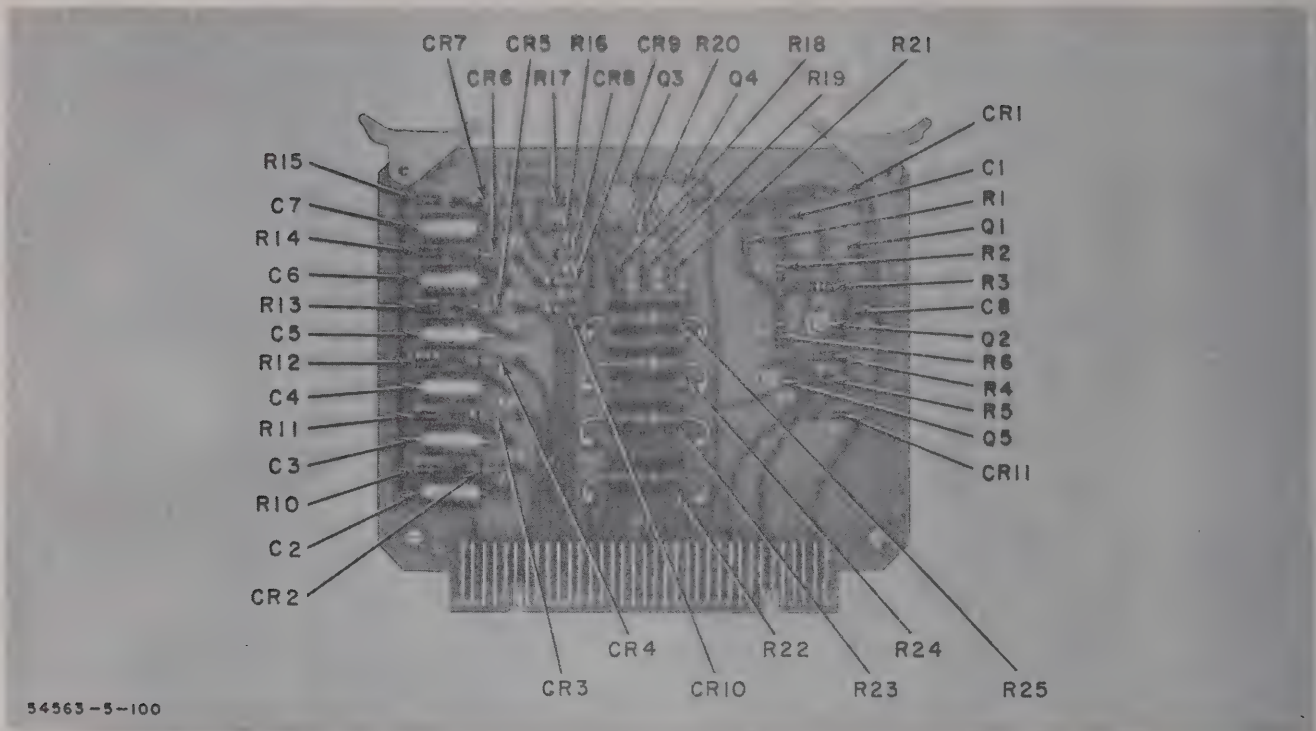


Figure 5-14. Pulse Generator and Sync Circuitry Printed Wiring Board A3,
ECI 61-00942-001, Part Location

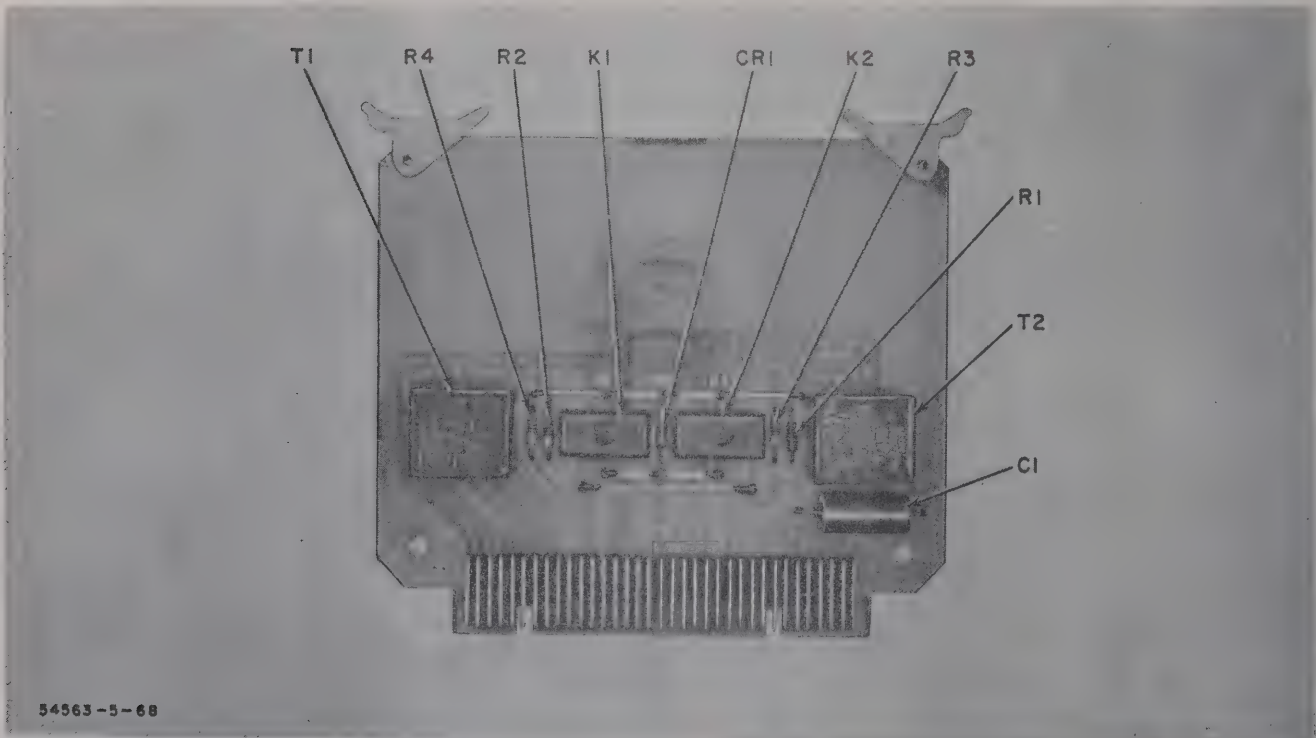


Figure 5-15. Transformers and Control Relays Printed Wiring Board A4,
ECI 61-00944-001, Part Location

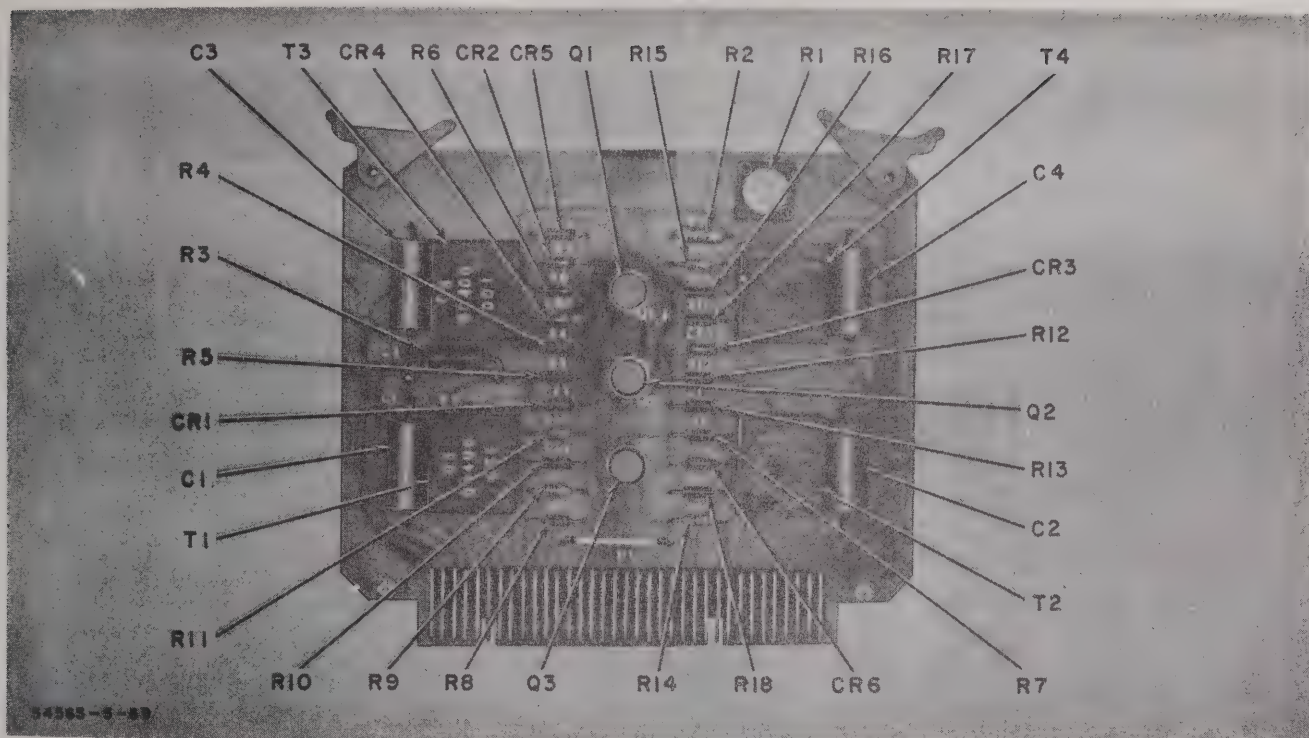


Figure 5-16. Transformers and Light Drivers Printed Wiring Board A5,
ECI 61-00945-001, Part Location

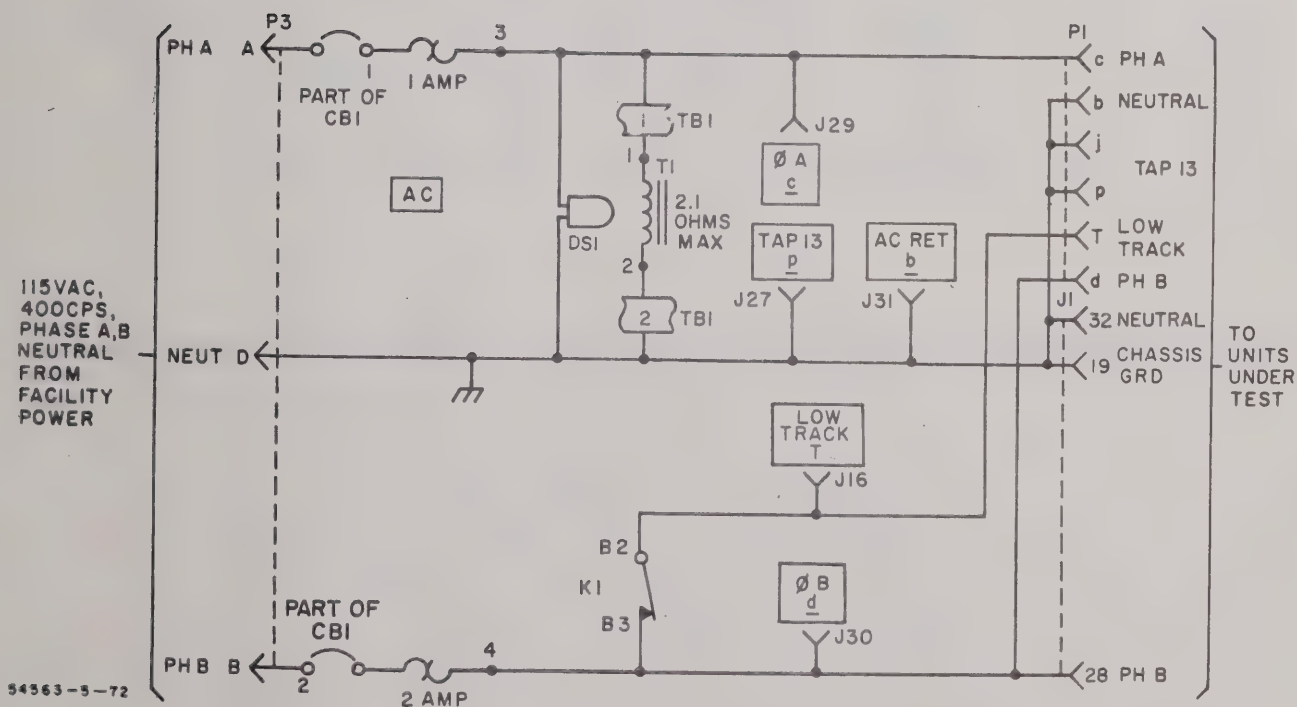


Figure 5-17. Test Adapter, MX-8152/TYA-11, AC Primary Power Distribution, Schematic Diagram

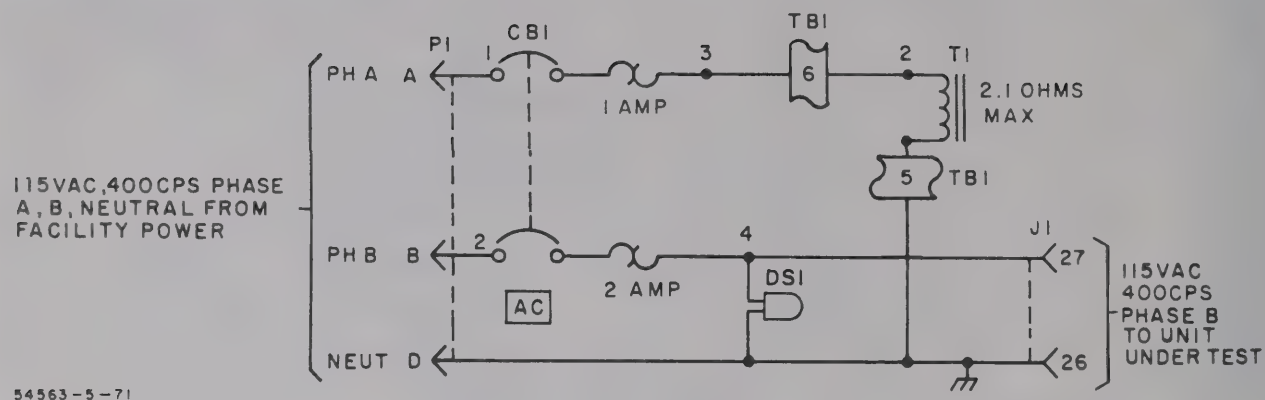


Figure 5-18. Test Set Coupler, MX-8153/TYA-11, AC Primary Power Distribution, Schematic Diagram

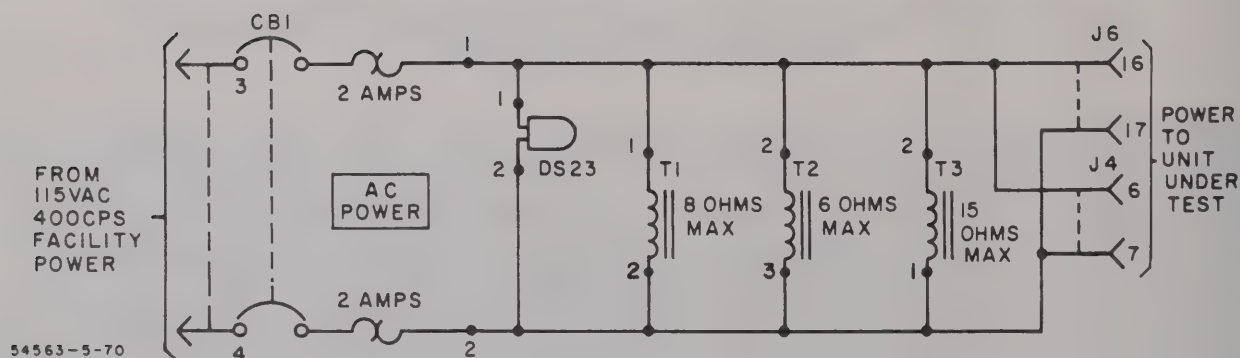


Figure 5-19. Test Set Coupler, MX-8154/TYA-11, AC Primary Power Distribution, Schematic Diagram

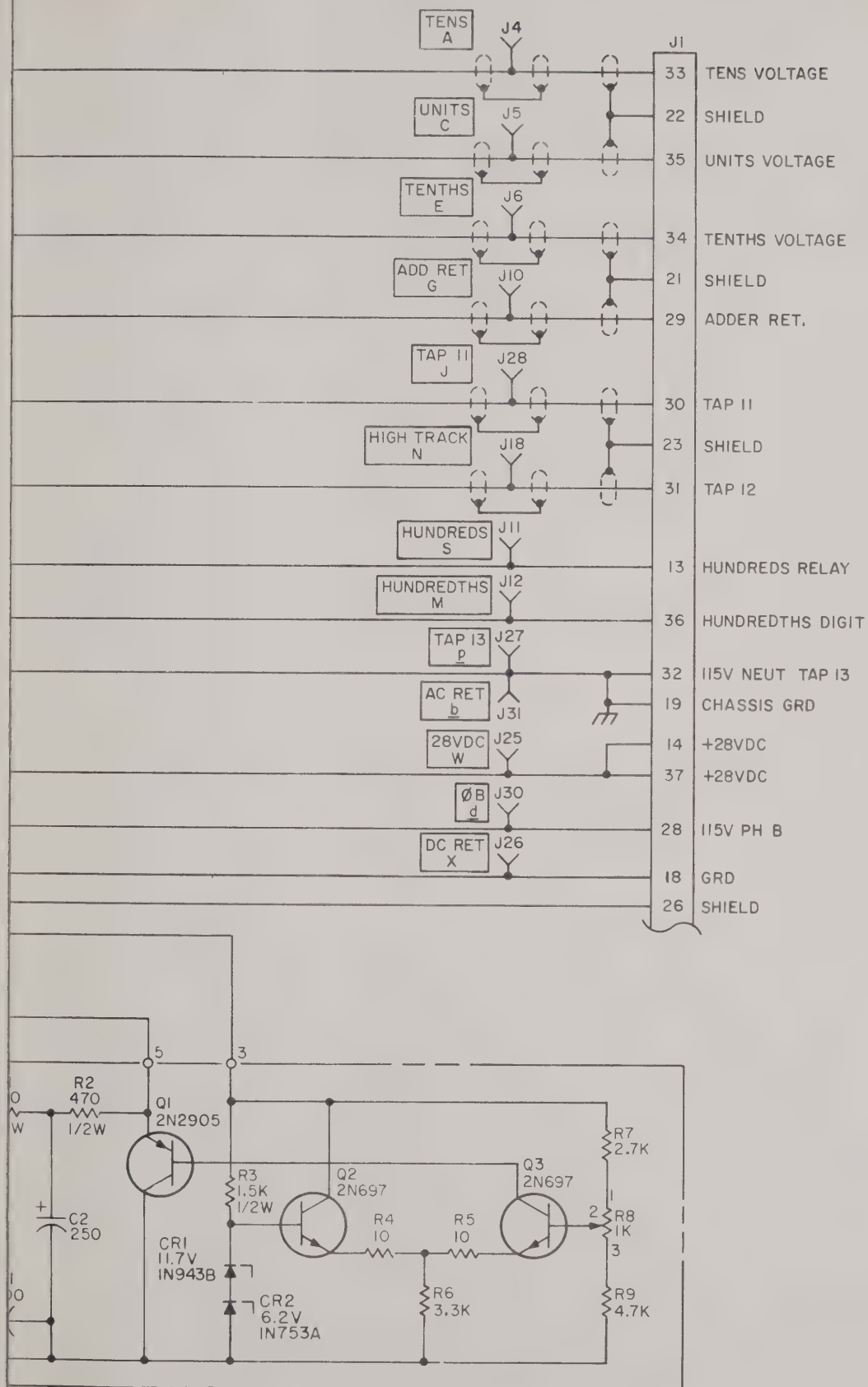


Figure 5-20. Test Adapter, MX-8152/TYA-11, Schematic Diagram

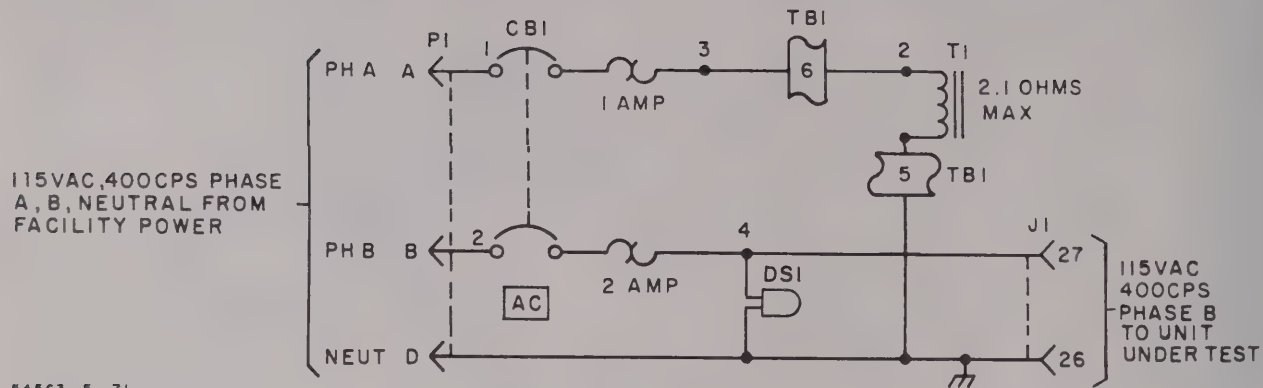


Figure 5-18. Test Set Coupler, MX-8153/TYA-11, AC Primary Power Distribution, Schematic Diagram

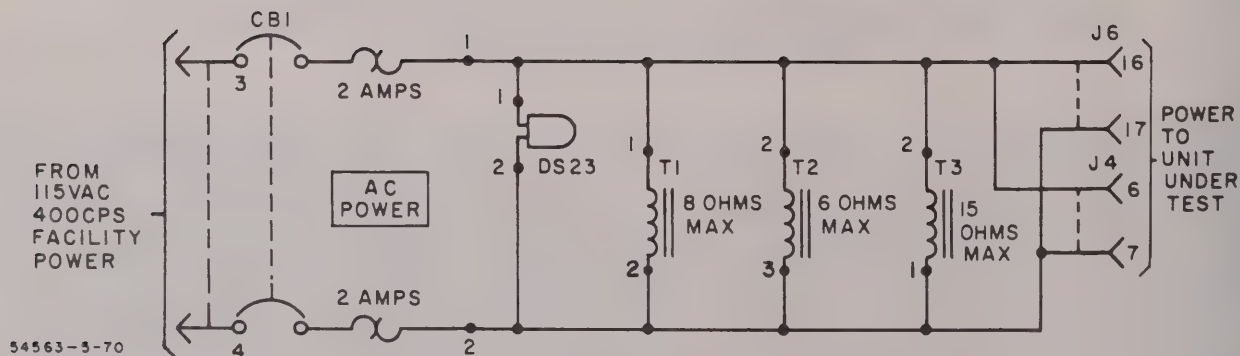


Figure 5-19. Test Set Coupler, MX-8154/TYA-11, AC Primary Power Distribution, Schematic Diagram

REFERENCE DESIGNATION	EMITTER	BASE	COLLECTOR
Q1	30.0 VDC	30 VDC	39.0 VDC
Q2	28.0 VDC	30 VDC	39.0 VDC
A1Q1	30.0 VDC	30 VDC	0.0 VDC
A1Q2	17.5 VDC	18 VDC	28.0 VDC
A1Q3	17.5 VDC	18 VDC	30.0 VDC

1. ALL VOLTAGES ARE APPROXIMATE TAKEN WITH CIRCUIT IN STATIC CONDITION.

NOTES:

- UNLESS OTHERWISE SPECIFIED: RESISTANCE VALUES ARE IN OHMS (K=1000), 1/4 WATT. CAPACITANCE VALUES ARE IN MICROFARADS.
- DESIGNATIONS IN PARENTHESIS ARE FOR REF ONLY.
- CONNECTOR MATING INFORMATION: P1 MATES WITH A1J1 THRU A1J4 ON ANTENNA COUPLER; P2 MATES WITH A1J5 ON ANTENNA COUPLER; P3 MATES WITH FACILITY POWER CONNECTOR; J1 MATES WITH P1 ON SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY, CX-10916/TYA-11.

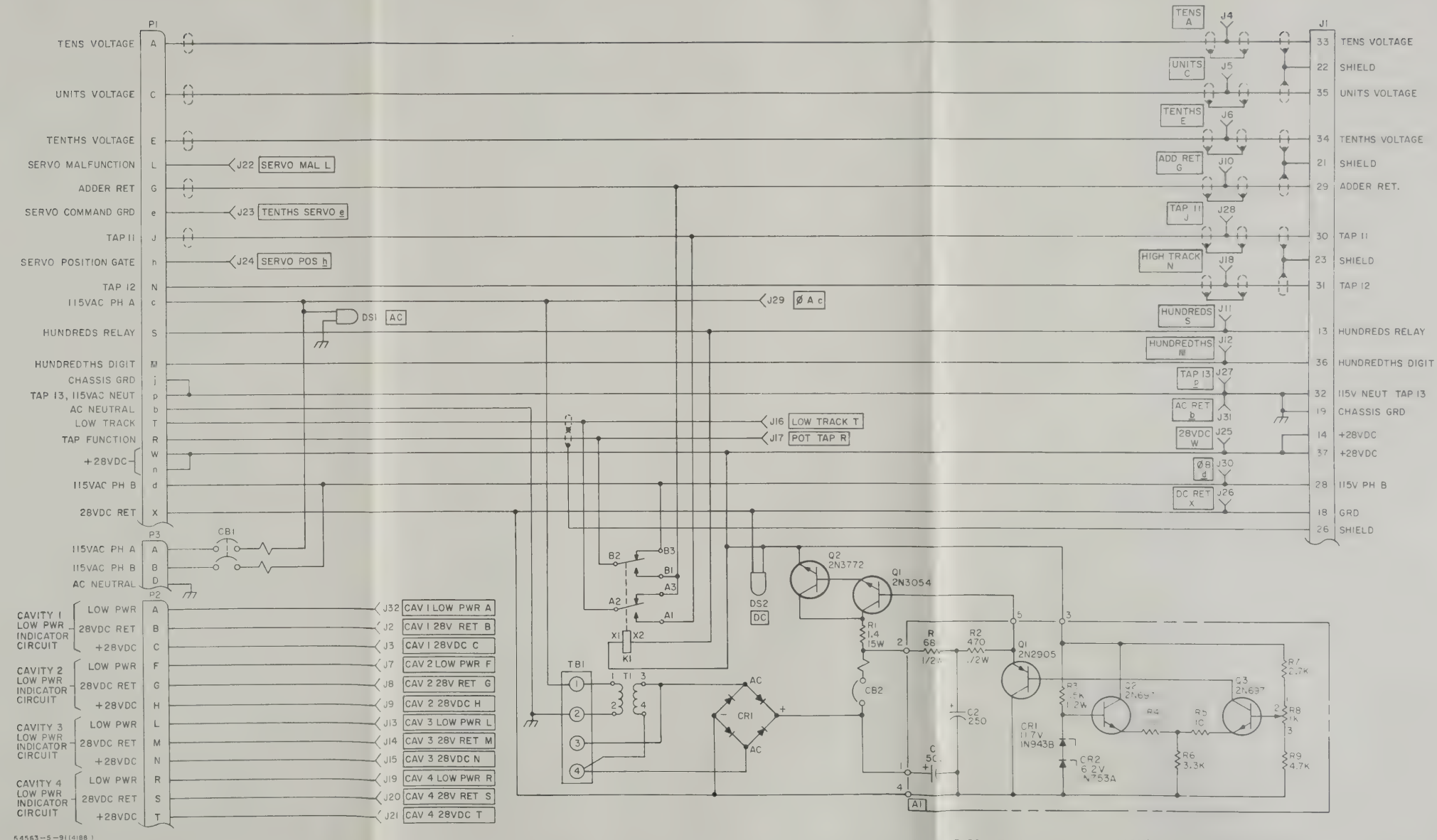


Figure 5-20. Test Adapter, MX-8152/TYA-11, Schematic Diagram



REFERENCE DESIGNATION	EMITTER	BASE	COLLECTOR
Q1	30.0 VDC	30 VDC	39.0 VDC
Q2	28.0 VDC	30 VDC	39.0 VDC
A1Q1	30.0 VDC	30 VDC	0.0 VDC
A1Q2	17.5 VDC	18 VDC	28.0 VDC
A1Q3	17.5 VDC	18 VDC	30.0 VDC

1. ALL VOLTAGES ARE APPROXIMATE TAKEN WITH CIRCUIT IN STATIC CONDITION.

NOTES:

1. UNLESS OTHERWISE SPECIFIED: RESISTANCE VALUES ARE IN OHMS (K=1000), 1/4 WATT. CAPACITANCE VALUES ARE IN MICROFARADS. SEMICONDUCTORS ARE JAN1N4245.
2. NUMBERS IN PARENTHESIS ARE FOR REFERENCE ONLY.
3. CONNECTOR MATING INFORMATION: P1 MATES WITH FACILITY POWER CONNECTOR; J1 MATES WITH A1A1P1 ON SYNTHESIZER-RECEIVERS; J2 MATES WITH A1A1P2 ON SYNTHESIZER-RECEIVERS; J3 MATES WITH P2 ON SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY, CX-10916/TYA-11

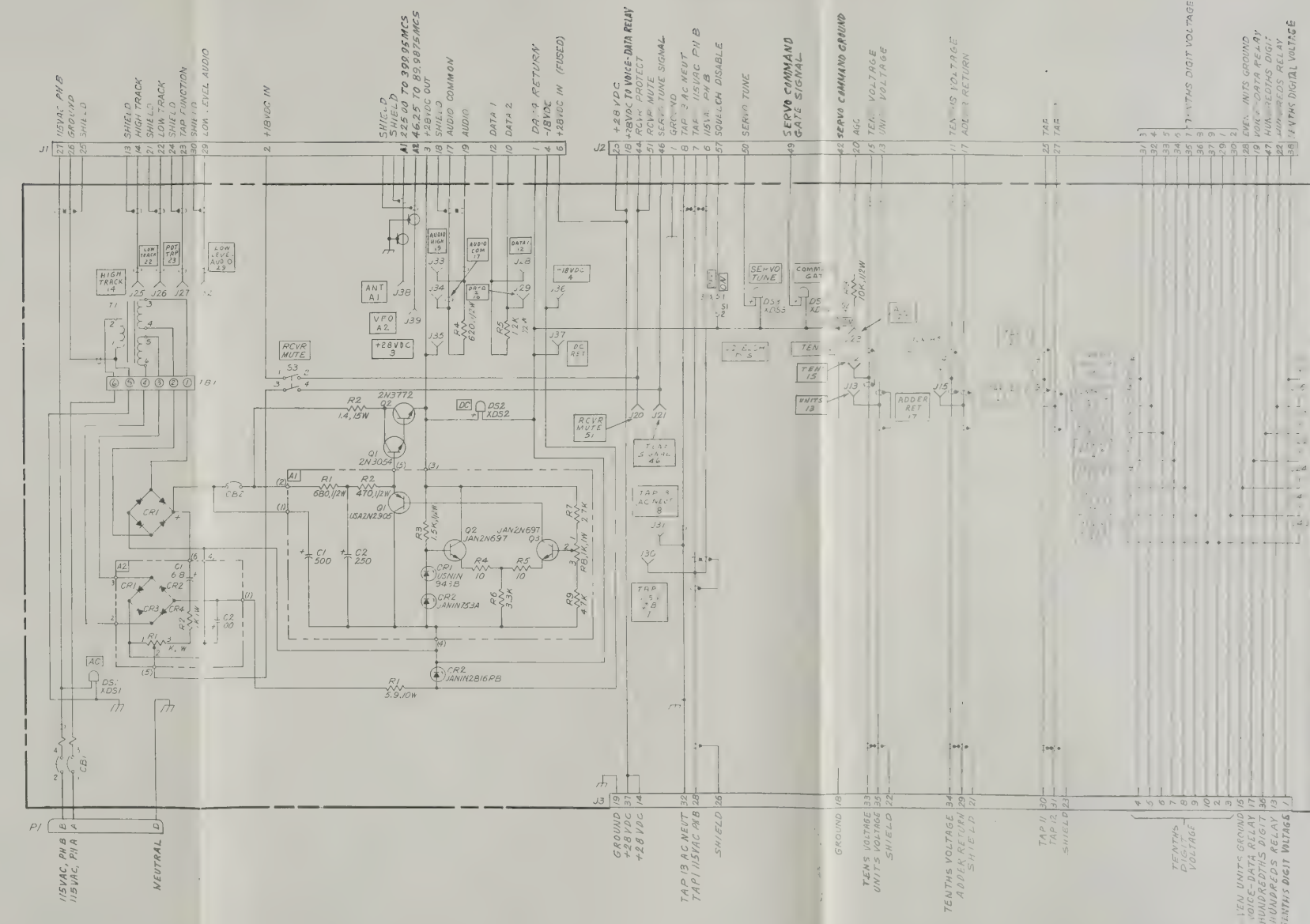
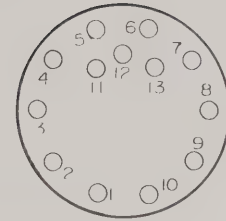
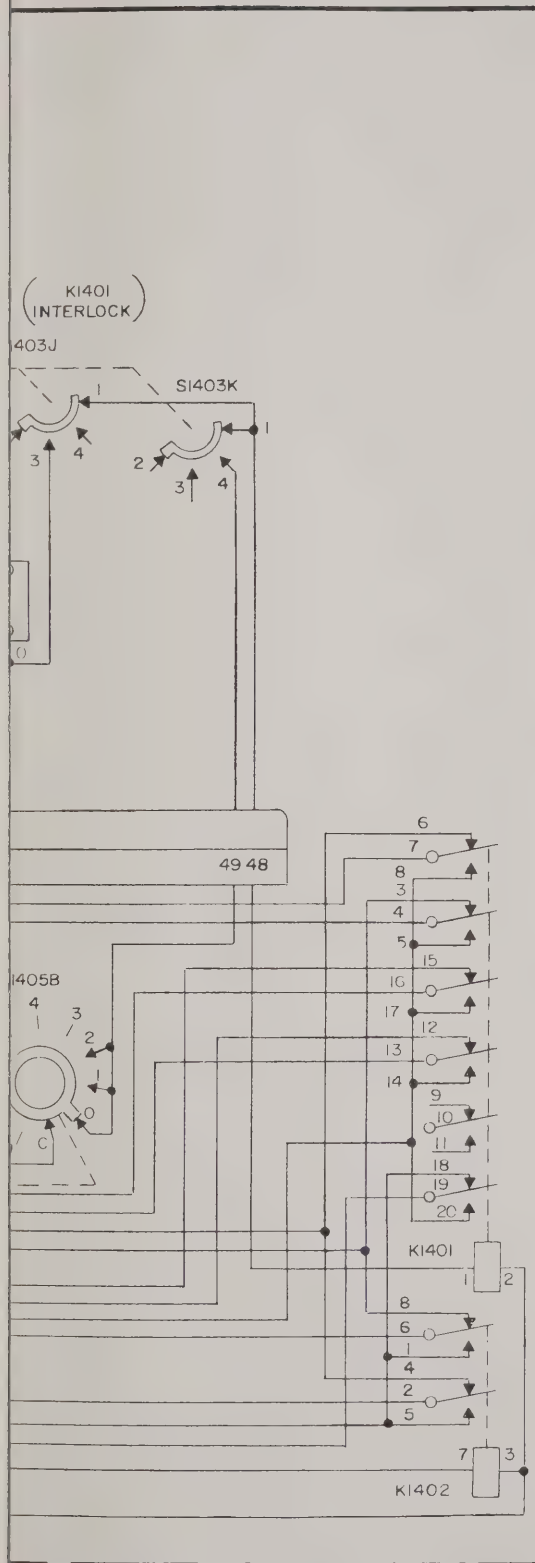


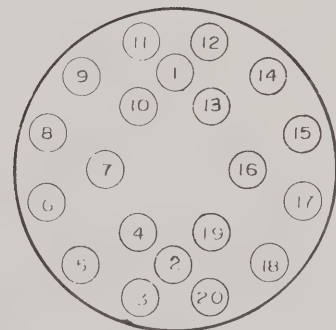
Figure 5-21. Test Set Coupler, MX-8153/TYA-11, Schematic Diagram



KI401



KI402

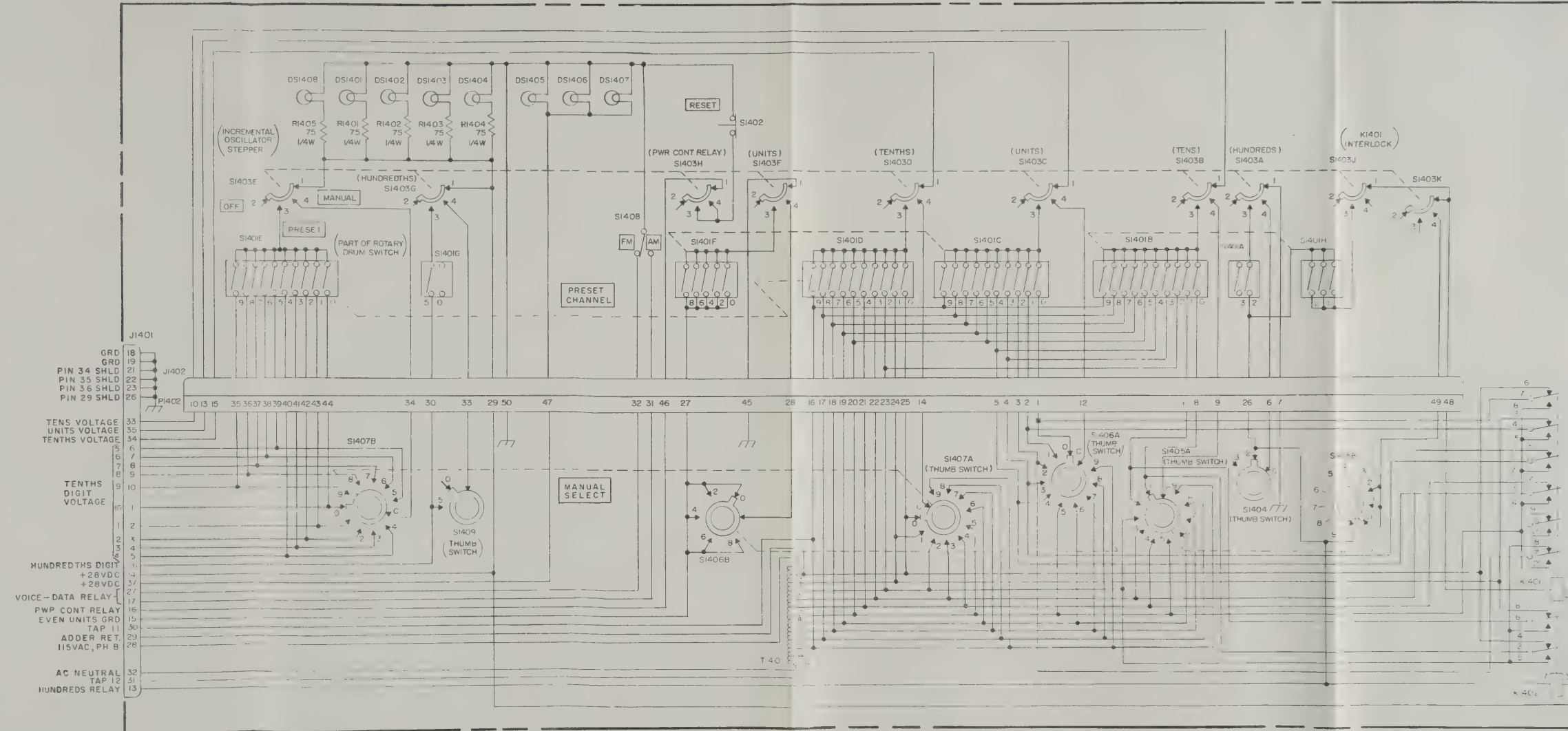


KI401

BOTTOM VIEW

NOTES:

1. RESISTANCES IN OHMS.
2. CONNECTS P1401 MATES WITH P1 ON SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY CX-10916/TYA-11
3. REFERENCE DESIGNATIONS ARE ABBREVIATED. PREFIX DESIGNATIONS WITH THEIR RESPECTIVE UNIT AND ASSEMBLY DESIGNATION AS APPLICABLE. PROPER IDENTIFICATION INDICATED AT INSTALLATION.



54563-5-92 (0585 REV F)

Figure 5-22. Radio Set Control, C-3811/AR, Schematic Diagram

ORIGINAL

5-65, 5-66

CAL AND
MOT
ESET
ANNE
DE

ORIGINAL

8154/TYA-11, Schematic Diagram (Sheet 1 of 2)



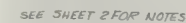


Figure 5-23. Test Set Coupler, MX-8154/TYA-11, Schematic Diagram (Sheet 1 of 2)

-6625-45/2-1

MK-1102, MK-1104, MX-8154
MAINTENANCE

+26.5VDC
+12VDC
-12VDC
+1.6VDC
+5.1VDC
GRD
GRD

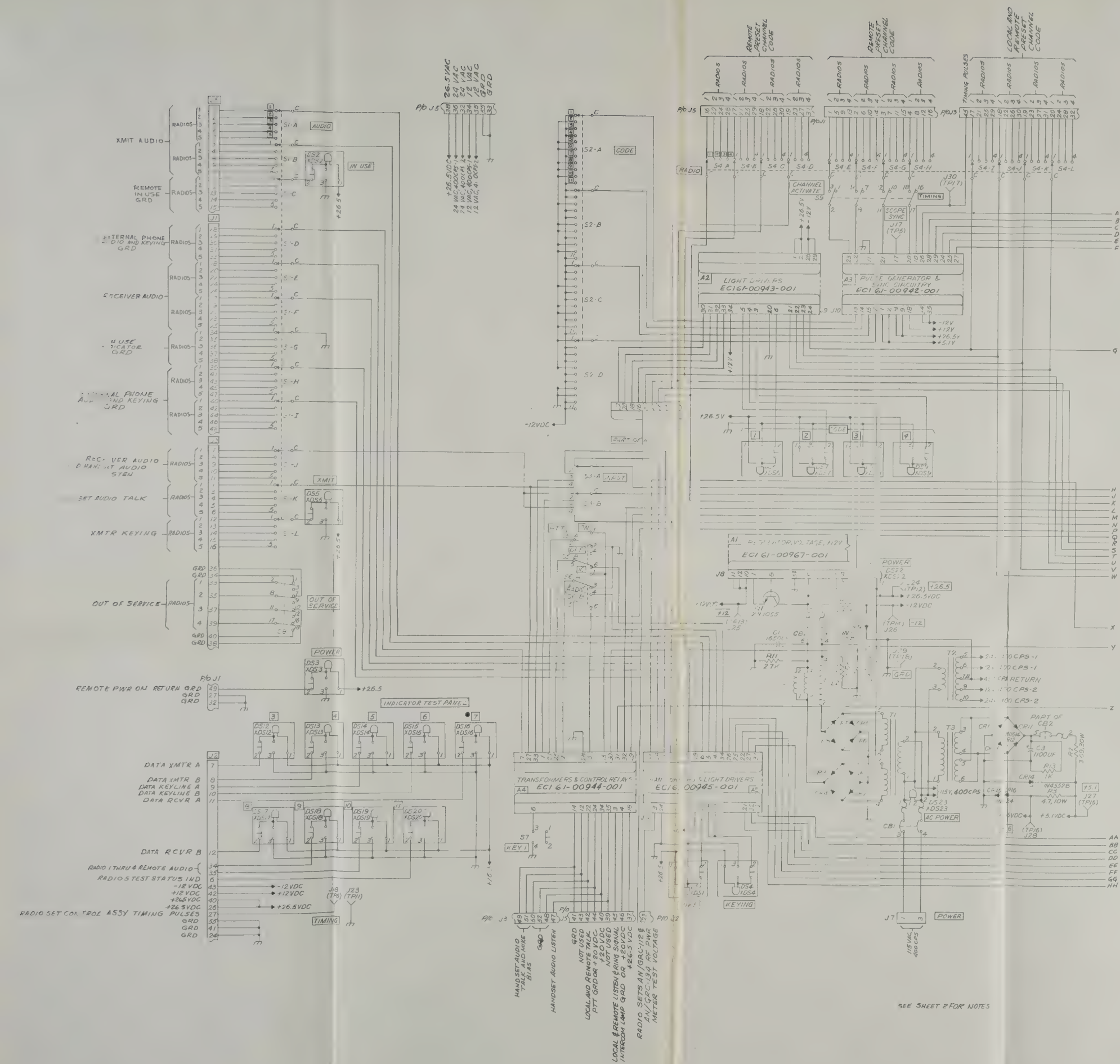


Figure 5-23

TM-6625-45/2-1

MK-1102, MK-1104, MX-8154
MAINTENANCE

Figure 5-23. Test Set Coupler, MX-8154/TYA-11, Schematic Diagram (Sheet 1 of 2)

NOTES:

1. UNLESS OTHERWISE SPECIFIED: RESISTANCE VALUES ARE IN OHMS (K = 1000), 1/4 WATT. INDUCTANCE VALUES ARE IN MICROHENRIES. DIODES ARE 1N2153.
2. CONNECTOR MATING INFORMATION:
J1 MATES WITH P1 ON BRANCHED SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY W1, ECI 12-01286-001
J2 MATES WITH P2 ON BRANCHED SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY W2, ECI 12-01287-001
J3 MATES WITH P3 ON BRANCHED SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY W3, ECI 12-01288-001
J4 MATES WITH P4 ON EITHER BRANCHED SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY W4, ECI 12-01289-001, OR W5, ECI 12-01290-001
J5 MATES WITH BRANCHED SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY W6, ECI 12-01291-001
J6 MATES WITH BRANCHED SPECIAL PURPOSE ELECTRICAL CABLE ASSEMBLY W7, ECI 12-01292-001
J7 MATES WITH SPECIAL PURPOSE CABLE ASSEMBLY W8, ECI 12-01303-001.

REFERENCE DESIGNATION	EMITTER	BASE	COLLECTION
Q1	12.08 VDC	12.6 VDC	26.0 VDC

1. ALL VOLTAGES ARE APPROXIMATE TAKEN WITH CIRCUIT IN STATIC CONDITION.

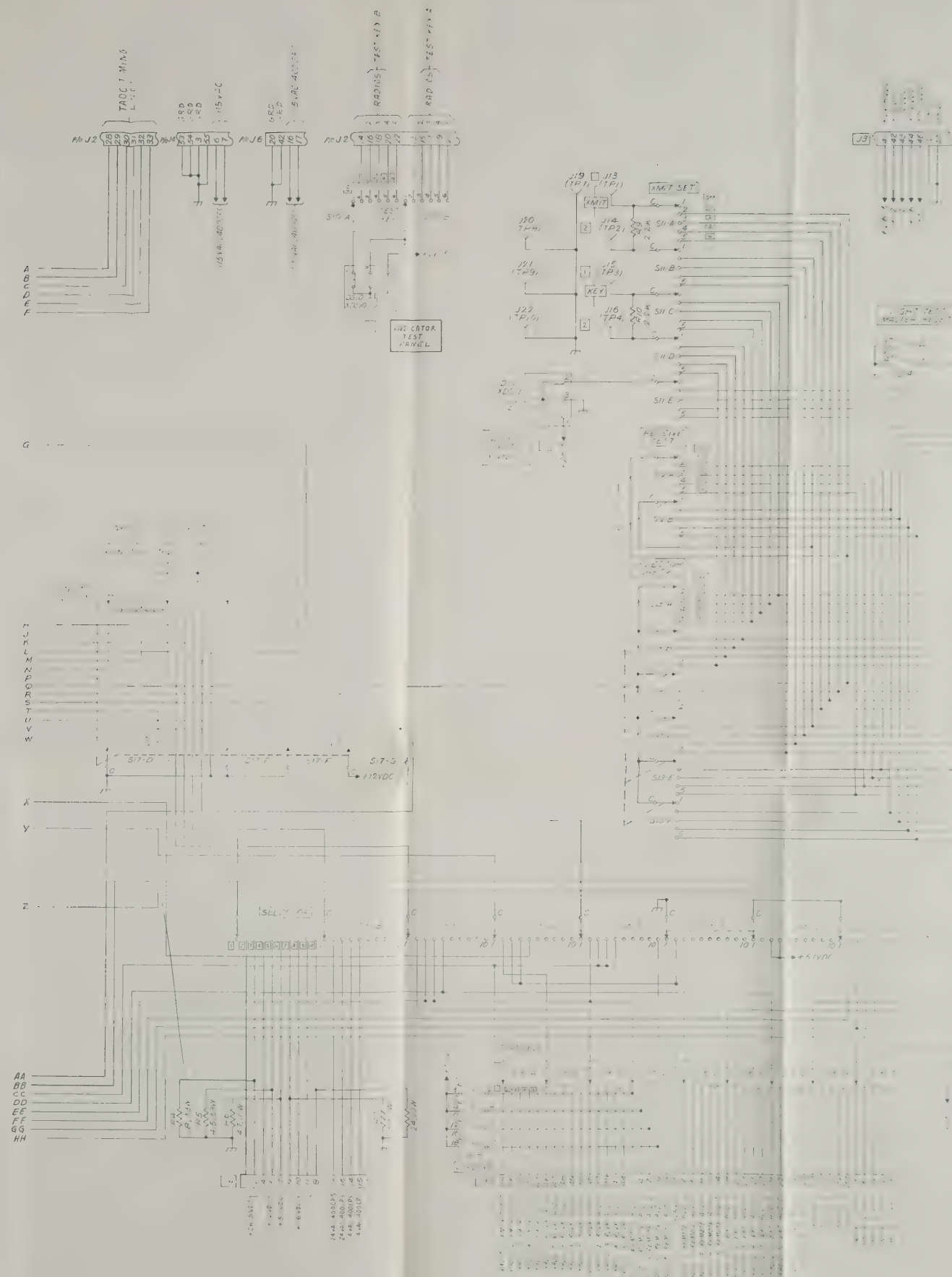
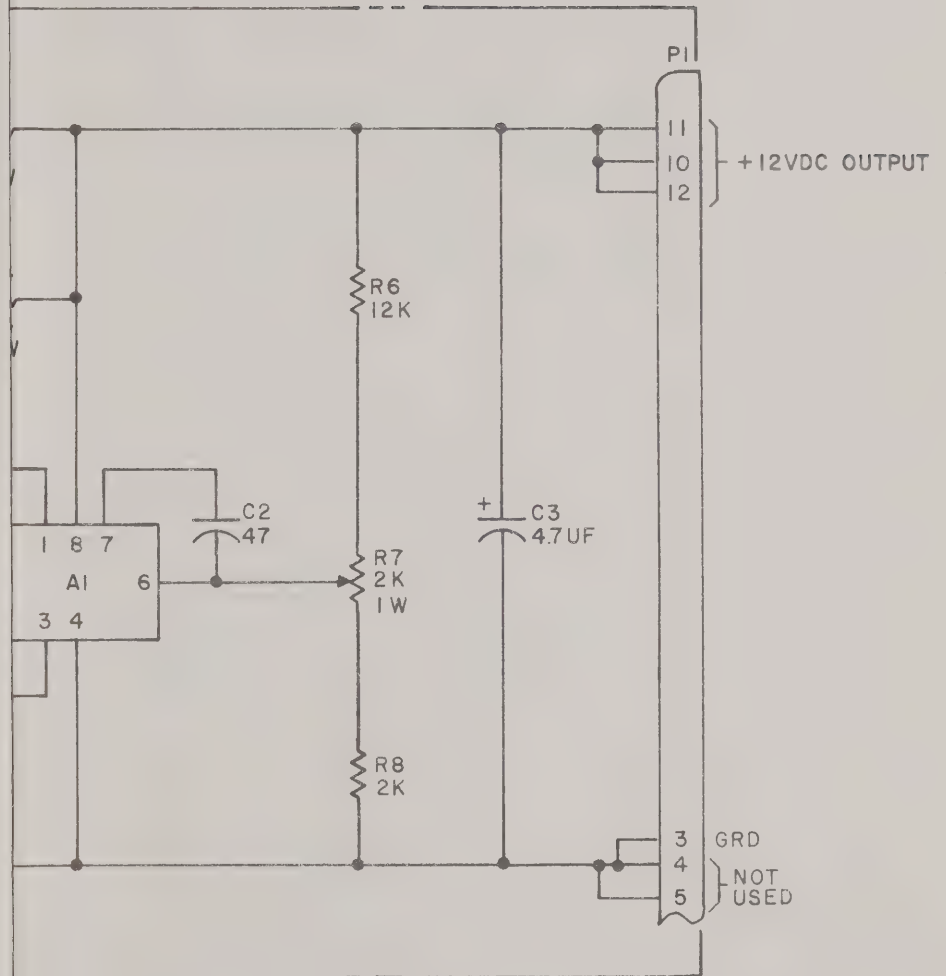


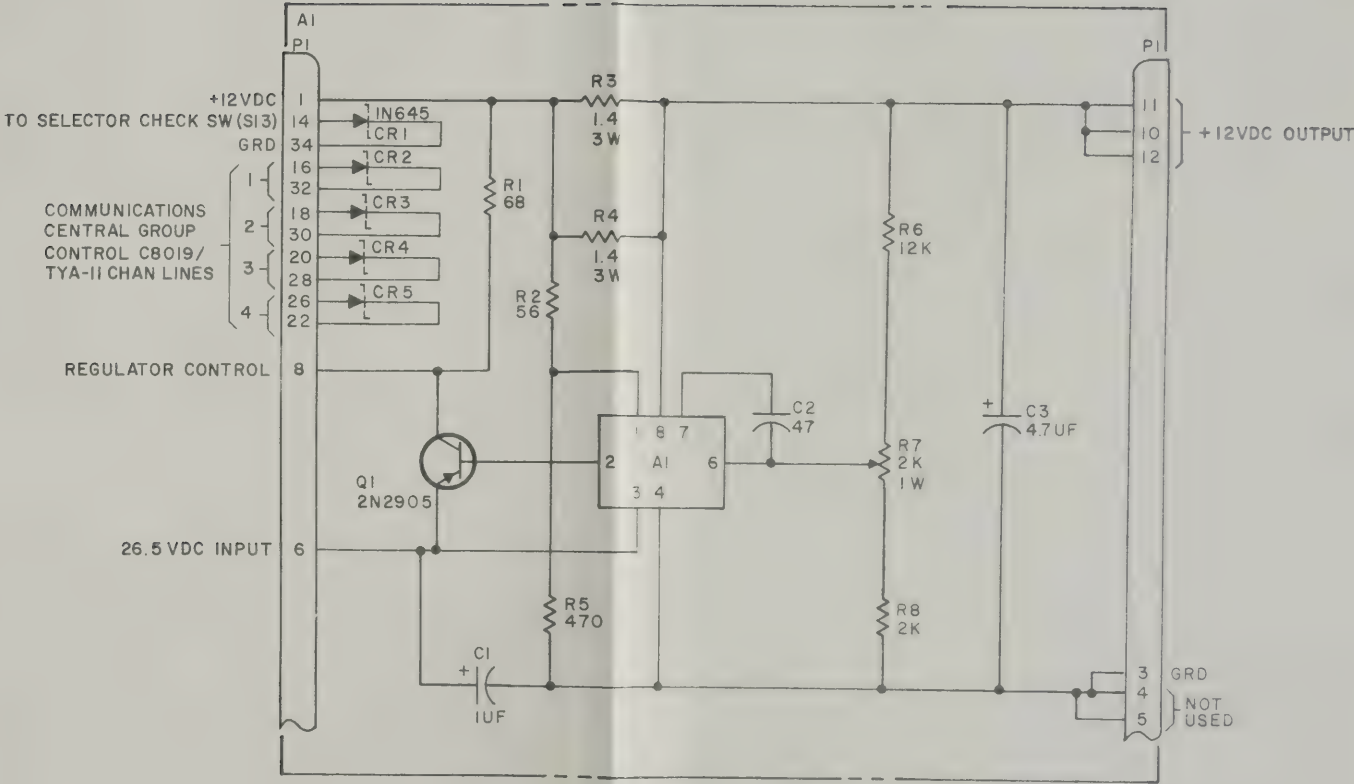
Figure 5-23. Test Set Coupler, MX-8154/TYA-11, Schematic Diagram, Sheet 2



tor Printed Wiring Board A1, ECI 61-00967-001, Schematic Diagram

- NOTES:
- UNLESS OTHERWISE SPECIFIED:
RESISTANCE VALUES ARE IN OHMS
(K= 1000), 1/4 WATT. CAPACITANCE
VALUES ARE IN MICROFARADS.
DIODES ARE 1N758A.
 - CONNECTOR P1 MATES WITH J8 IN
TEST SET COUPLER, MX-8154/TYA-
11

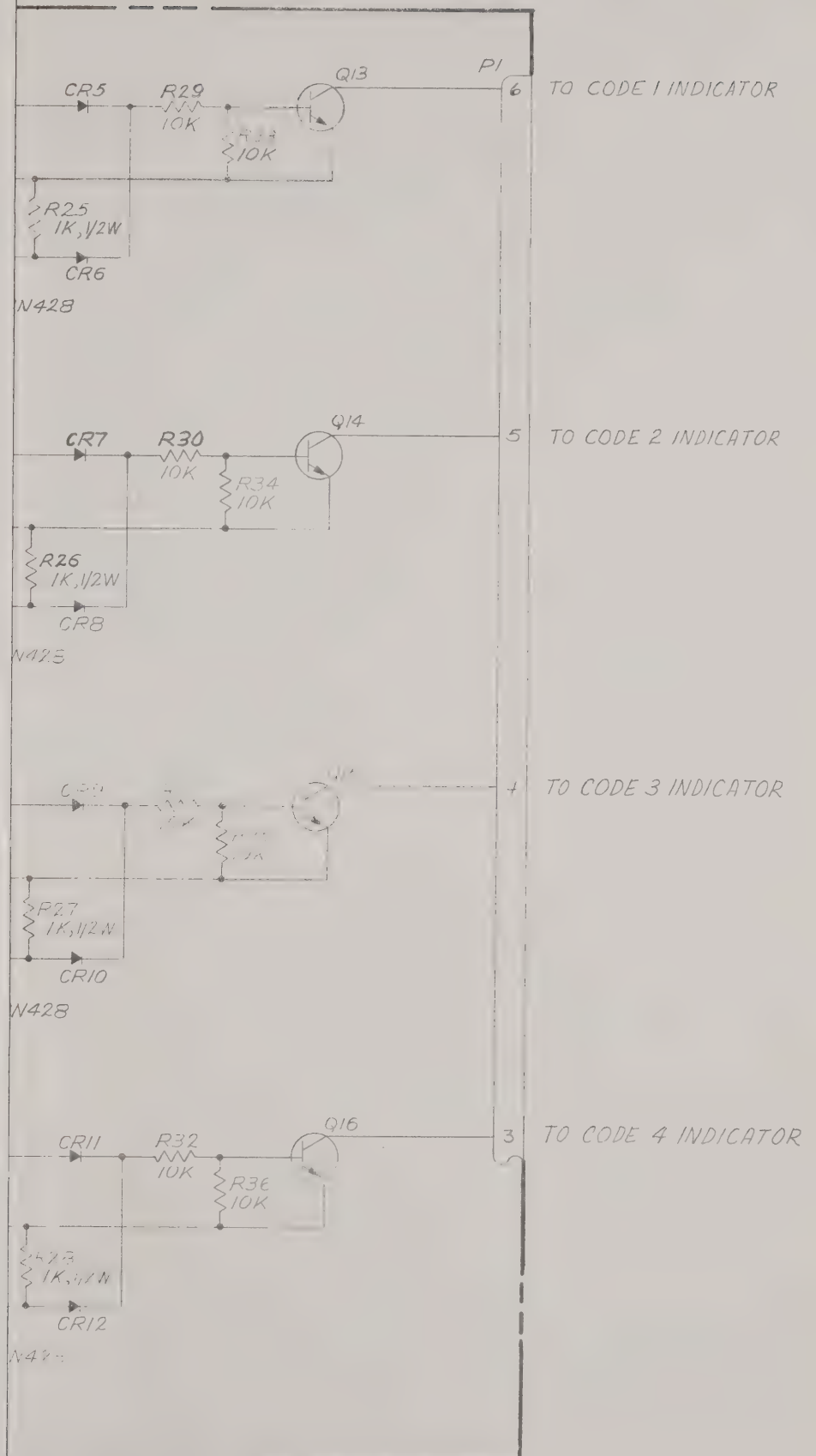
REFERENCE DESIGNATION	EMITTER	BASE	COLLECTOR
Q1	26.5 VDC	26.5 VDC	12.6 VDC
1. ALL VOLTAGES ARE APPROXIMATE TAKEN WITH CIRCUIT IN STATIC CONDITION.			



54563-5-85(4284B)

Figure 5-24. +12-Volt Regulator Printed Wiring Board A1, ECI 61-00967-001, Schematic Diagram

ORIGINAL



s Printed Wiring Board A2, ECI 61-00943-001, Schematic Diagram

REFERENCE DESIGNATION	EMITTER	BASE	COLLECTOR
Q1*	0.6 VDC	1.1 VDC	1.1 VDC
Q5**	12.0 VDC	OPEN	1.1 VDC
Q9***	12.0 VDC	15.0 VDC	0.0 VDC
Q13****	0.0 VDC	0.0 VDC	+26.5 VDC

1. ALL VOLTAGES ARE APPROXIMATE TAKEN WITH CIRCUIT IN STATIC CONDITION.

*Q1 VOLTAGES ARE TYPICAL FOR Q2 THROUGH Q4.

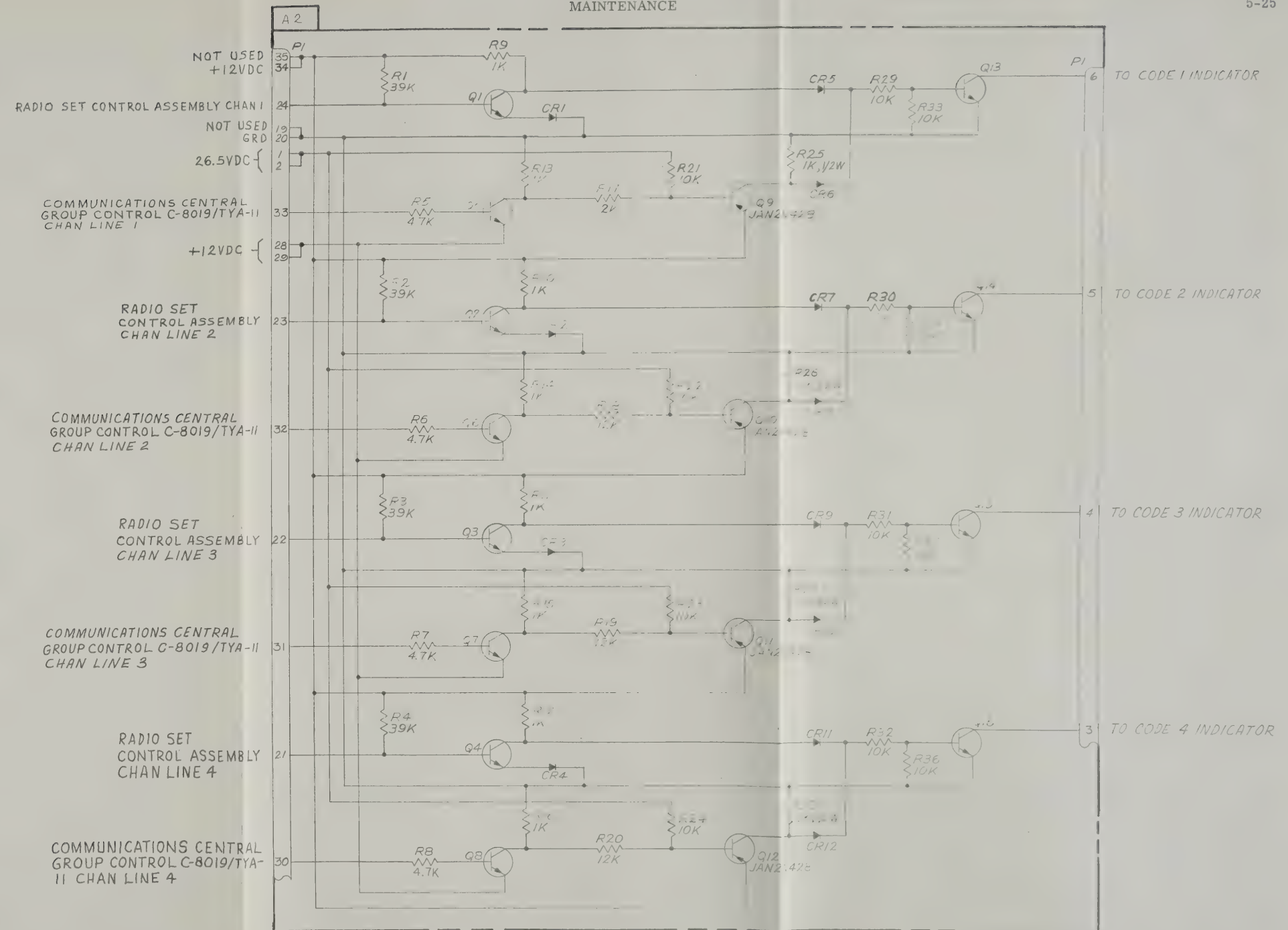
**Q5 VOLTAGES ARE TYPICAL FOR Q6 THROUGH Q8.

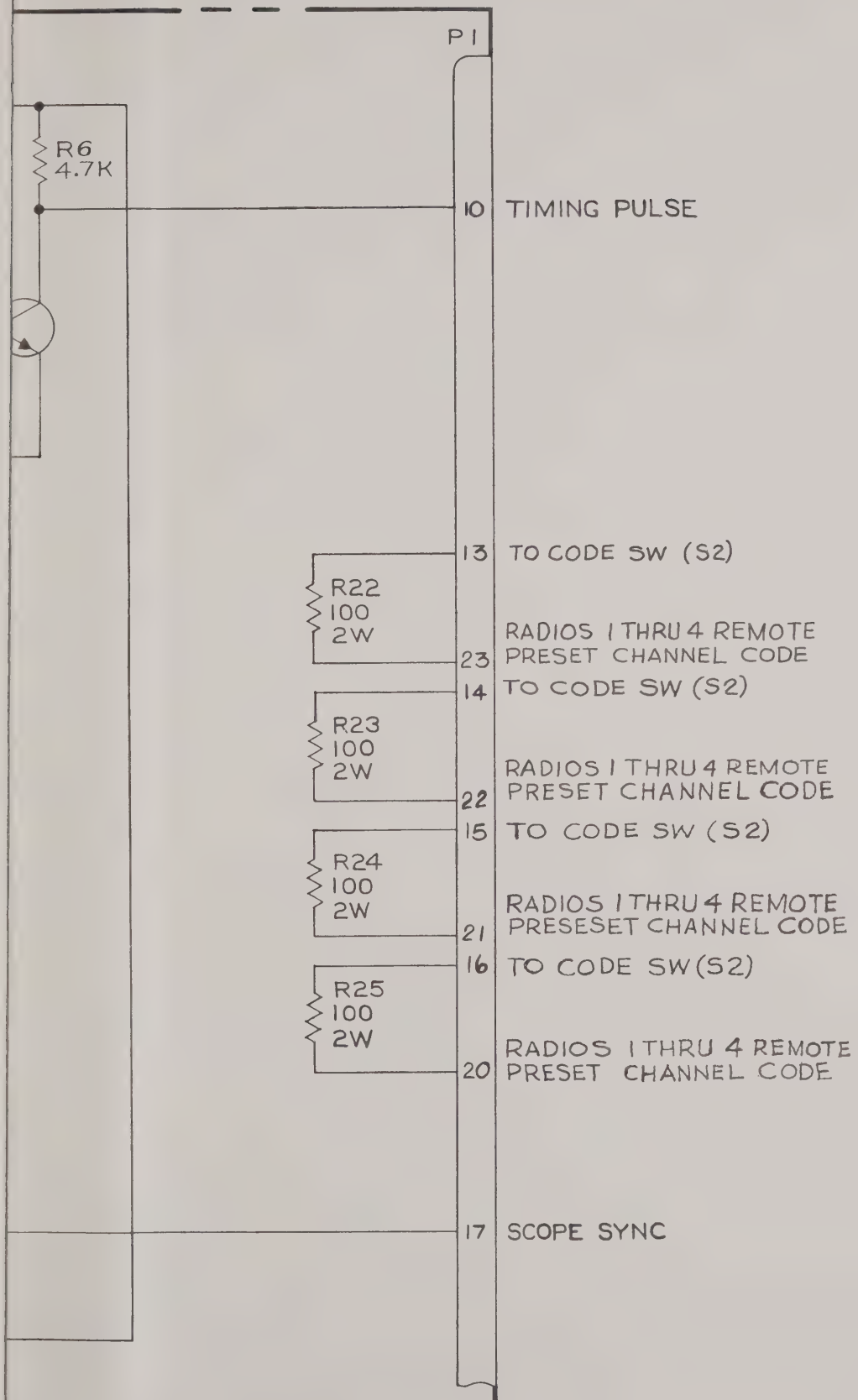
***Q9 VOLTAGES ARE TYPICAL FOR Q10 THROUGH Q12.

****Q13 VOLTAGES ARE TYPICAL FOR Q14 THROUGH Q16.

NOTES:

- UNLESS OTHERWISE SPECIFIED: RESISTANCE VALUES ARE IN OHMS (K-1000), 1/4 WATT. DIODES ARE 1N914. TRANSISTORS ARE 2N697.
- CONNECTOR P1 MATES WITH J9 IN TEST SET COUPLER, MX-8154/TYA-11



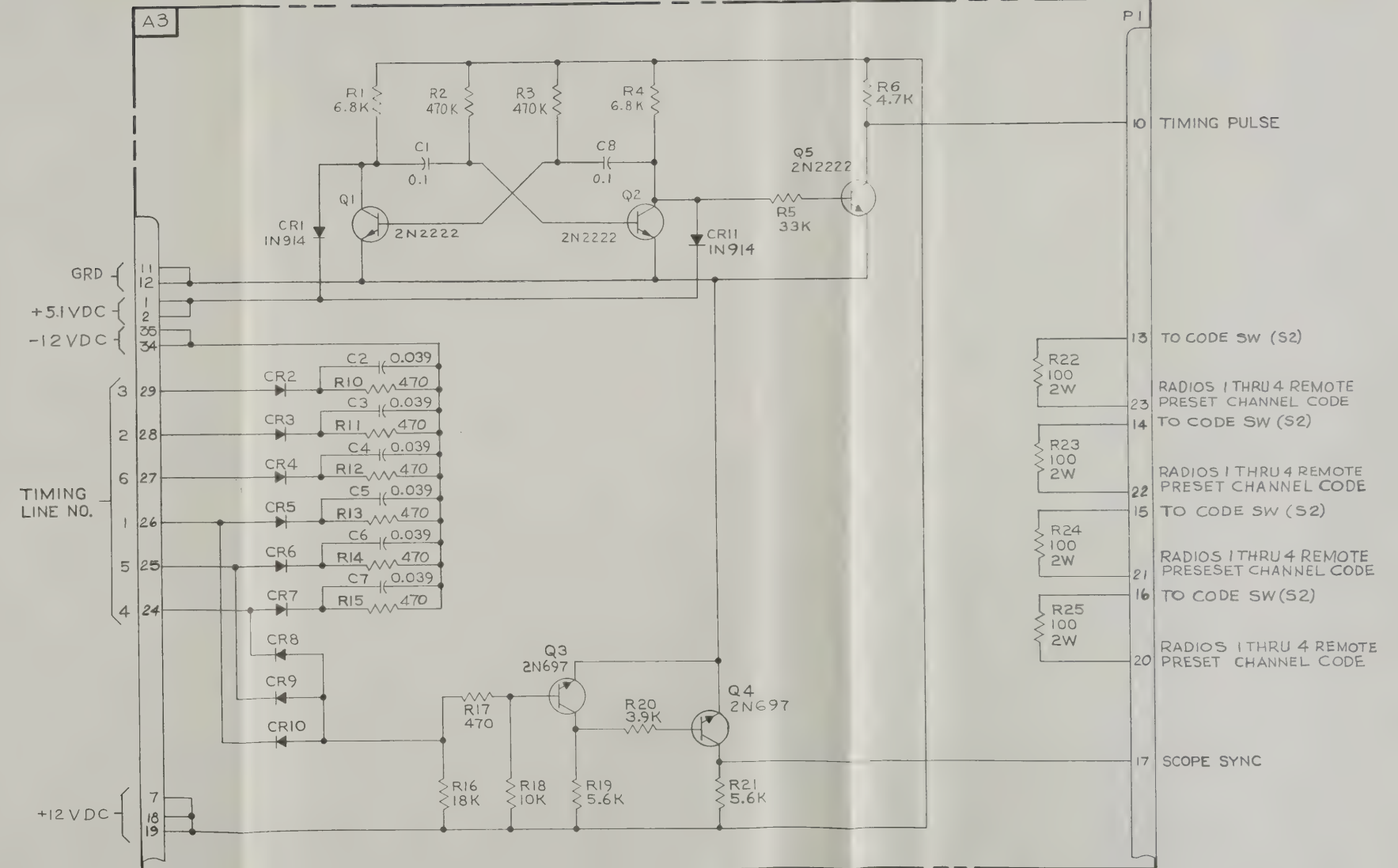


6. Pulse Generator and Sync Circuitry Printed Wiring Board A3,
ECI 61-00942-001, Schematic Diagram

REFERENCE DESIGNATION	EMITTER	BASE	COLLECTOR
Q1	0.0 VDC		
Q2	0.0 VDC		
Q3	0.0 VDC	-9.0 VDC	+5.0 VDC
Q4	0.0 VDC	+0.5 VDC	+0.5 VDC
Q5	0.0 VDC		
1. ALL VOLTAGES ARE APPROXIMATE TAKEN WITH CIRCUIT IN STATIC CONDITION.			

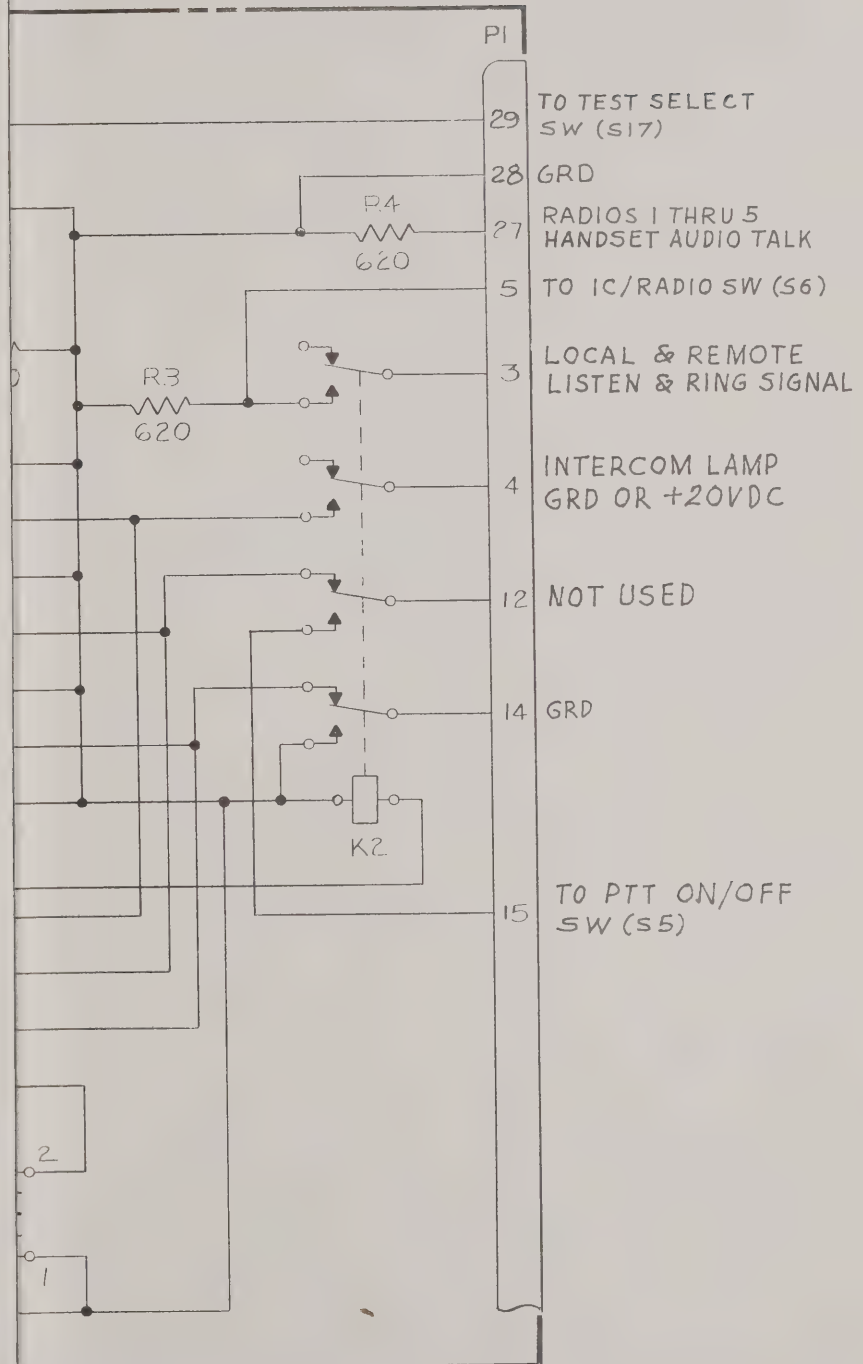
NOTES:

- UNLESS OTHERWISE SPECIFIED: RESISTANCE VALUES ARE IN OHMS (K = 1000), 1/4 WATT. CAPACITANCE VALUES ARE IN MICROFARADS. DIODES ARE IN914.
- CONNECTOR P1 MATES WITH J10 ON TEST SET COUPLER, MX-8154/TYA-11



54563-5-96(42588)

Figure 5-26. Pulse Generator and Sync Circuitry Printed Wiring Board A3, ECI 61-00942-001, Schematic Diagram



former and Control Relay Printed Wiring Board A4,
61-00944-001, Schematic Diagram

- NOTES:
1. UNLESS OTHERWISE SPECIFIED: RESISTANCE VALUES ARE IN OHMS (K=1000), 1/4 WATT.
 2. CONNECTOR P1 MATES WITH J11 ON TEST SET COUPLER, MX-8154/TYA-11

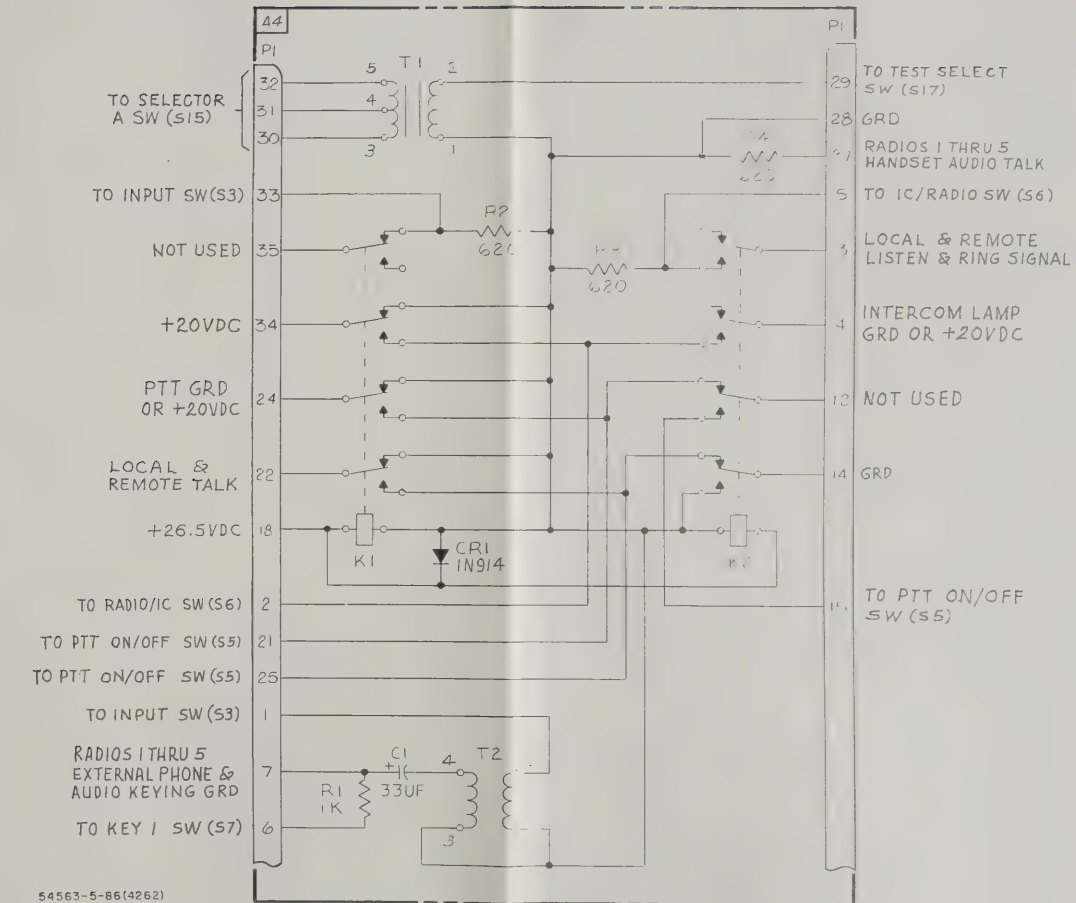
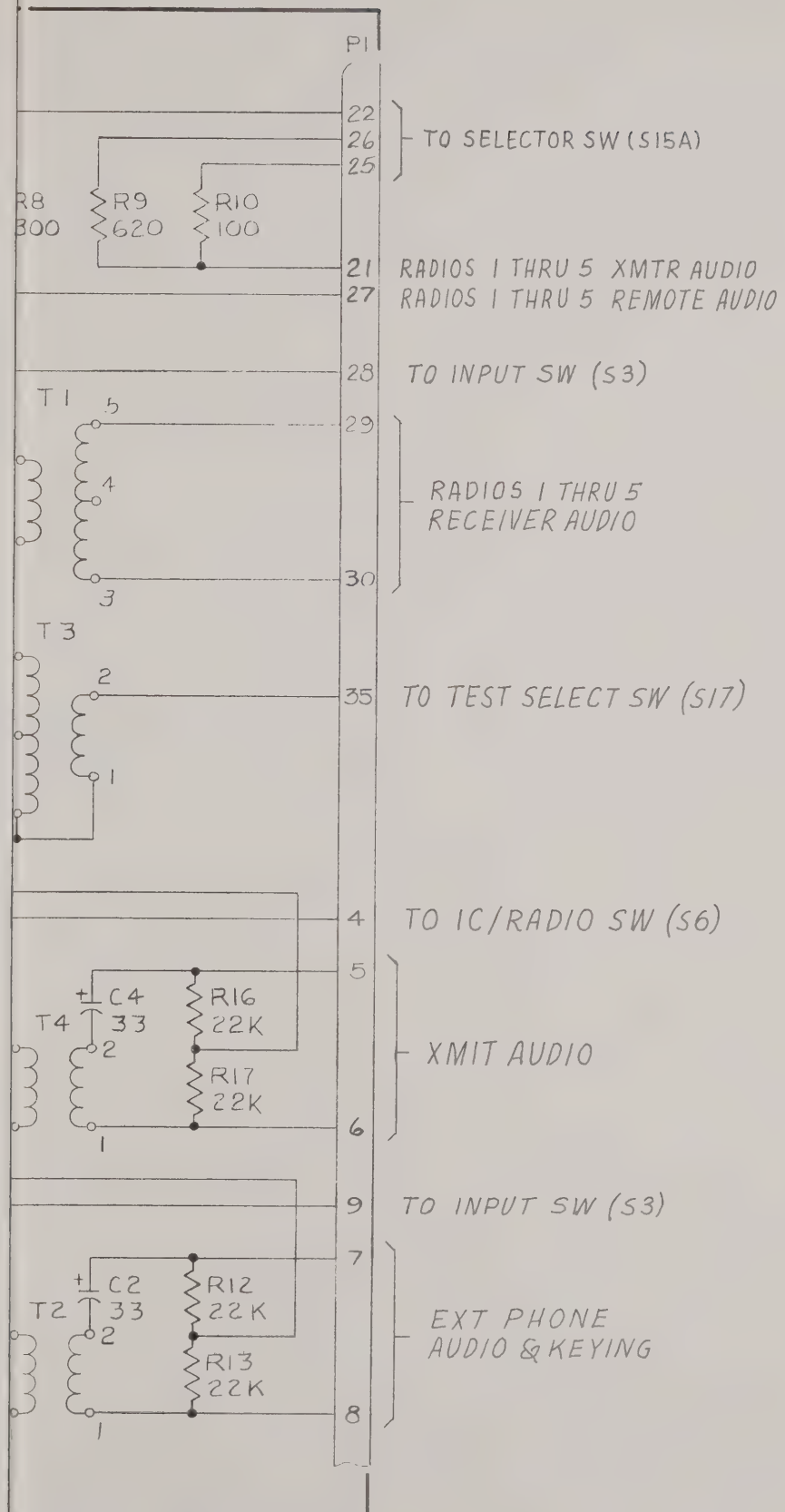


Figure 5-27. Transformer and Control Relay Printed Wiring Board A4,
ECI 61-00944-001, Schematic Diagram



REFERENCE DESIGNATION	EMITTER	BASE	COLLECTOR
Q1*	0.0 VDC	OPEN	+26.5 VDC
1. ALL VOLTAGES ARE APPROXIMATE TAKEN WITH CIRCUIT IN STATIC CONDITION. *Q1 VOLTAGES ARE TYPICAL FOR Q2 AND Q3.			

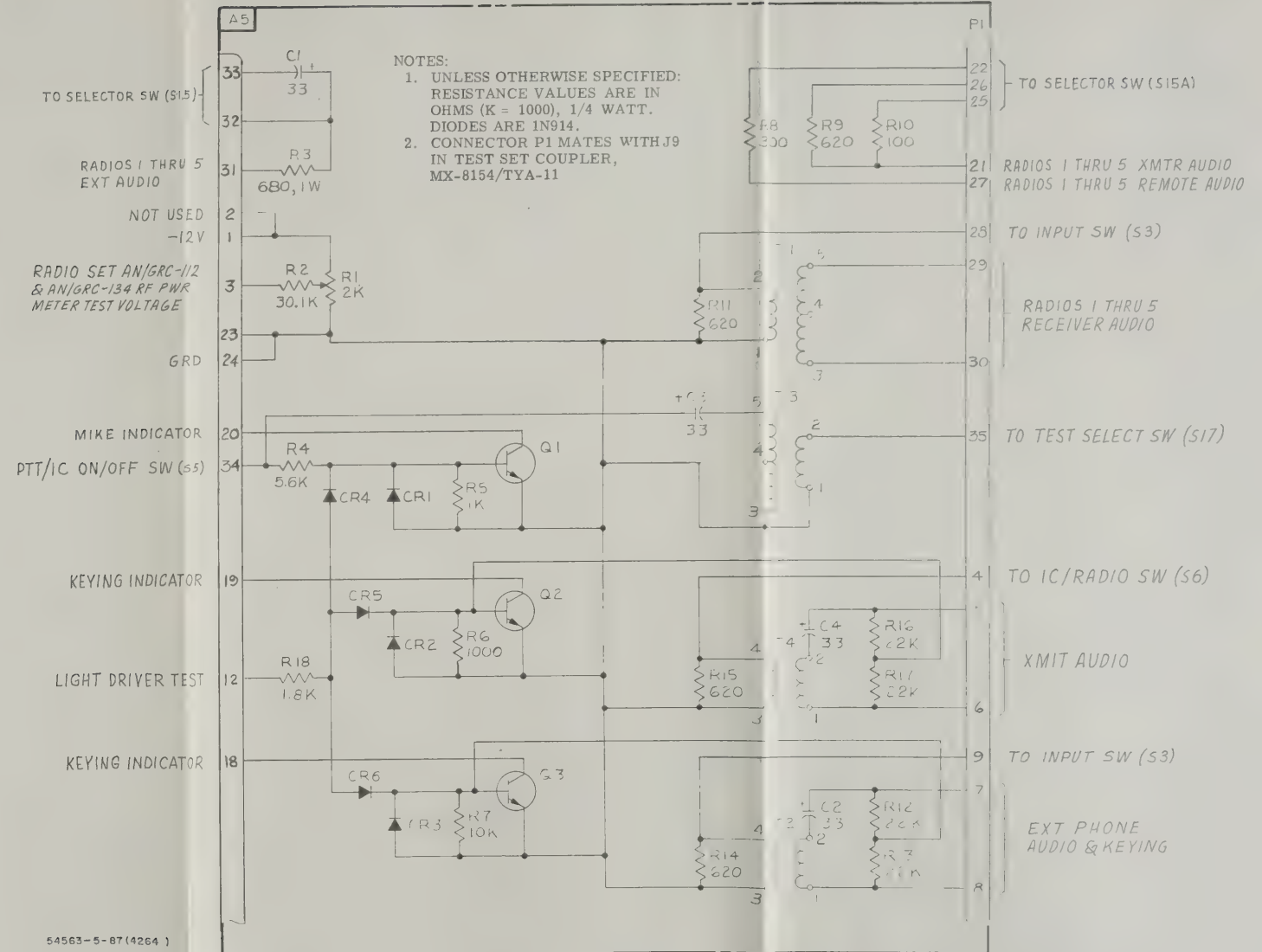


Figure 5-28. Transformer and Light Drivers Printed Wiring Board A5.
ECI 61-00945-001, Schematic Diagram

INDEX

	Paragraph (Figure) *Table		Paragraph (Figure) *Table
A		B (Cont)	
Ac primary schematic diagrams...	5-4d	Branched Special Purpose Elec- trical Cable Assembly W2, ECI	
Control Group Test Set, ECI		12-01287-001	(1-11),
01-00784-001	(5-19)	1-2c(2)(b)	
Test Adapter, MX-8152/TYA-11.	(5-17)	wire running list	*5-19
Test Set Coupler, MX-8153/ TYA-11	(5-18)	Branched Special Purpose Elec- trical Cable Assembly W3, ECI	
Adapters and connectors	(1-5),	12-01288-001	(1-11),
1-2a(4), *1-1,		1-2c(2)(c)	
1-2b(4)(d), (1-9),		wire running list	*5-20
1-2b(4)(e)		Branched Special Purpose Elec- trical Cable Assembly W4, ECI	
Adapter, UG-29B/U	(1-5),	12-01289-001	(1-11),
1-2a(4), *1-1		1-2c(2)(d)	
Adapter, UG-1107/U	(1-5),	wire running list	*5-21
1-2a(4), *1-1		Branched Special Purpose Elec- trical Cable Assembly W5, ECI	
Adapter, UG-1108/U	(1-5),	12-01290-001	(1-11),
1-2a(4), *1-1		1-2c(2)(e)	
Adjustment procedures	5-3	wire running list	*5-22
Test Adapter, MX-8152/TYA-11.	5-3a	Branched Special Purpose Elec- trical Cable Assembly W6, ECI	
Test Set Coupler, MX-8153/ TYA-11	5-3b	12-01291-001	(1-11),
Test Set Coupler, MX-8154/ TYA-11	5-3c	1-2c(2)(f)	
Adjustments and alignments	4-2c(1)(b)4	wire running list	*5-23
Adjustment, tuning, operator	3-3c	Branched Special Purpose Elec- trical Cable Assembly W7, ECI	
Assembly-to-part location		12-01292-001	(1-11),
cross reference list	*5-1, 5-4a	1-2c(2)(g)	
Audio amplifier functional section .	4-3c	wire running list	*5-24
B		C	
Bandpass Filter, F-1233/V	(1-3),	Cable assemblies	(1-4),
1-2a(2)(3), (1-9),		1-2a(3), (1-7), 1-2b(2),	
1-2b(4)(a)		(1-11), 1-2c(2)	
Branched Special Purpose Elec- trical Cable Assembly,		special cable assemblies	2-5
CX-10930/TYA-11	(1-7),	Central group control functional section	4-3f
1-2b(2)(f)		Coaxial Crystal Mixer, CV-2513/U.	(1-3),
wire running list	*5-16	1-2a(2)(b), (1-9),	
Branched Special Purpose Elec- trical Cable Assembly,		1-2b(4)(c)	
CX-10931/TYA-11	(1-7),	Communications Test Kit,	
1-2b(2)(g)		MK-1102/TYA-11	(1-1), 1-1,
wire running list	*5-17	1-2a	
Branched Special Purpose Elec- trical Cable Assembly W1, ECI		adapters and connectors	*1-1, (1-5),
12-01286-001	(1-11),	1-2a(4)	
1-2c(2)(a)		cable assemblies	(1-4),
wire running list	*5-18	1-2a(3)	

INDEX (Cont)

	Paragraph (Figure) *Table		Paragraph (Figure) *Table
C (Cont)		C (Cont)	
Communications Test Kit, MK-1102/TYA-11 (Cont)		Control Group Test Set, ECI	
description	1-2a	01-00784-001	(1-10), 1-2c(1)
equipment supplied	*1-5, 1-4	ac primary power distribution ..	(5-19)
functional operation	3-1c	part location	(5-11)
installation	(2-1), 2-4	schematic diagram	(5-23)
operating procedures	3-2a	Control power supply	4-3a
preparation for reshipment	1-8	functional section	4-3b
reference data	*1-2, 1-3	Coupler test fixture	4-2d
repair instructions	5-2a		
test accessories	(1-3), 1-2a(2)	D	
test adapters, fixtures, and radio control	(1-2), 1-2a(1)	Description of units	1-2
unpacking and handling	2-1	Communications Test Kit, MK-1102/TYA-11	1-2a
Communications Test Kit, MK-1102/TYA-11	4-4	Communications Test Kit, MK-1104/TYA-11	1-2b
Communications Test Kit, MK-1104/TYA-11	(1-1), 1-2b	Test Set Coupler, MX-8154/ TYA-11	1-2c
Communications Central Control Group, C-8019/TYA-11, test procedure	3-3d(5), *3-12	Diagrams	
Connector Adapter, UG-1840/U ...	(1-5), 1-2a(4), *1-1, (1-9), 1-2b(4)d	test setup	4-1e
Connector Adapter, UG-1841/U ...	(1-5), 1-2a(4), *1-1, (1-9), 1-2b(4)e	test point locations	4-1e
Connector Adapter, UG-1838/U ...	(1-5), 1-2a(4), *1-1	E	
Connector Adapter, UG-1839/U ...	(1-5), 1-2a(4), *1-1	Electrical Connector Assembly, MX-8159/TYA-11	(1-6), 1-2b(1)(g)
Connector Adapter, UG-201A/U ...	(1-5), 1-2a(4), *1-1	Electrical Dummy Load, DA-490/U	(1-3), 1-2a(2)(c)
Connector Adapter, UG-274B/U ...	(1-5), 1-2a(4), *1-1	Electrical Power Cable Assembly, CX-10932/TYA-11	(1-4), 1-2a(3)(d)
Connector Adapter, UG-335/U	(1-5), 1-2a(4), *1-1	wire running list	*5-8
Connector Adapter, UG-559B/U ...	(1-5), 1-2a(4), *1-1	Electrical Power Cable Assembly, CX-10933/TYA-11	(1-4), 1-2a(3)(f)
Connector Adapter, UG-606/U	(1-5), 1-2a(4), *1-1	wire running list	*5-9
Connector Adapter, UG-914/U	(1-5), 1-2a(4), *1-1	Equipment and publications required but not supplied	*1-6, 1-5
Connector Adapter, UG-1034/U ...	(1-5), 1-2a(4), *1-1	Equipment similarities	1-7
Control Group Test Set	4-3	Equipment supplied	*1-5, 1-4
power supply	4-3a	External audio functional section ..	4-3c(5)
		F	
		Factory or field changes	1-6
		Failure analysis	4-1f
		Failure, performance, and operational reports	5-1

INDEX (Cont)

	Paragraph (Figure) *Table		Paragraph (Figure) *Table
F (Cont)		I (Cont)	
Five Channel Audio Amplifier- Connector, ECI 01-00730-001, test procedure	3-3d(4), *3-11	Indicator test functional section ...	4-3e
Fixed Attenuator, CN-1248/U	(1-3),	Inspection.....	2-6
1-2a(2)(a)		Installation requirements	(2-1), (2-2), (2-3), 2-4
Fixed Attenuator, CN-1249/U	(1-3),	Interference reduction.....	2-7
1-2a(2)(a)		Light Drivers Printed Wiring Board A2, ECI 61-00967-001	
Fixed Attenuator, CN-1250/U	(1-3),	part location.....	(5-13)
1-2a(2)(a)		schematic diagram	(5-25)
Fixed Mounting Rotating Counter, ECI 03-01937-001	(1-3),	Loading functional section	4-3c(6)
1-2a(2)(g)		light drivers	4-3d(3)(a)
functional operation	3-1c(6)	Lowpass Filter, ECI 03-01945-001.	(1-9), 1-2b(4)(b)
operating instructions	3-3e(6)		
operating procedures	*3-16	M	
Frequency tuning functional section.	4-2c(3)	Maintenance, operator's.....	3-4
Functional Operation	3-1a	Manual contract number	1-1
Communications Test Kit, MK-1102/TYA-11.....	3-1c	Manual specification	1-1
Communications Test Kit, MK-1104/TYA-11.....	3-1b	Microphone circuit function.....	4-3f(1)(e)
Control Group Test Set, ECI 01-00784-001.....	3-1a	Module Extender, PL-1228/TYA-11.	(1-6), 1-2b(1)(a)
Fixed-Mounting Rotating Counter, ECI 03-01937-001....	3-1c(6)	Module Extender, PL-1229/TYA-11.	(1-2), 1-2b(1)(f)
Radio Set Control, C-3811/AR..	3-1c(5)	Module Extender, PL-1231/TYA-11.	(1-7), 1-2b(3)(c)
Test Adapter, MX-8150/TYA-11.	3-1c(1)	Module Extender, PL-1232/TYA-11.	(1-8), 1-2b(3)(b)
Test Adapter, MX-8151/TYA-11.	3-1c(2)	Module Extender, PL-1233/TYA-11.	(1-2), 1-2a(1)(f), (1-8), 1-2b(3)(a)
Test Adapter, MX-8152/TYA-11.	3-1c(3)	Monitoring functional section.....	4-2c(2)
Test Set Coupler, MX-8153/ TYA-11.....	3-1c(4)		
H		N	
Heat Sink, ECI 67-02324-001 part location.....	(5-5)	Narrow band audio function	4-2a(1)(e)
Heat Sink, ECI 67-02325-001 part location.....	(5-8)	O	
High track function.....	4-2b2(i)	Operating controls and indicators	
I		Radio Set Control, C-3811/AR...	3-3a(7)
Illustrations.....	5-4	Test Adapter, MX-8150/TYA-11.	3-3a(2), 3-3e(1), *3-13
ac primary power schematics ..	5-4c	Test Adapter, MX-8151/TYA-11.	3-3a(3), 3-3e(2), *3-14
part location.....	*5-1, 5-4a	Test Adapter, MX-8152/TYA-11.	3-3a(4)
schematic diagrams	*5-3, 5-4d	Test Adapter, MX-8158/TYA-11.	3-3a(6)
wire running lists	*5-2, 5-4b	Test Set Coupler, MX-8153/ TYA-11.....	3-3a(5), 3-3e(4), *3-16
Indicator presentations	3-3b	Test Set Coupler, MX-8154/ TYA-11.....	3-3a(1)
Indicator Test Electrical Assembly, ECI 01-00508-001 test procedure	3-3d(2), *3-9		

INDEX (Cont)

	Paragraph (Figure) *Table	Paragraph (Figure) *Table
O (Cont)		P (Cont)
Operating instructions		Plug-in unit extenders..... (1-6), 1-2b(1)
Fixed Mounting Rotating Counter, ECI03-01937-001....	3-3e(6), *3-18	Power requirements *2-1, 2-2
Radio Set Control, C-3811/AR...	3-3e(5)	Power Supply, ECI 01-00509-001 test procedure 3-3d(3), *3-10
Test Adapter, MX-8152/TYA-11.	3-3e(3), *3-15	Power Supply 18/28-Volt Printed Wiring Board A2, ECI 61- 00928-001
Operating procedures		adjustment 5-3b(2)
Communications Test Kit, MK-1102/TYA-11.....	3-3e	part location..... (5-7)
Communications Test Kit, MK-1104/TYA-11.....	3-3f	schematic diagram..... (5-21)
emergency	3-4b	Power supply functional section ... 4-2d(1)
Test Set Coupler, MX-8154/TYA-11.....	3-3d, *3-8, *3-9, *3-10, *3-11 and *3-12	Preparation for reshipment 1-8
		Preparation for use 3-2
		Preset channel code function..... 4-3d(1)(h)
		Preset channel selection..... 4-3e(1)(b)
		Printed-Circuit Board Adapter, PL-1227/TYA-11..... (1-6), 1-2b(1)(c)
		Printed-Wiring Board Adapter, PL-1226/TYA-11..... (1-6), 1-2b(1)(d)
		Printed-Wiring Board Adapter, PL-1230/TYA-11..... (1-6), 1-2b(1)(e)
		Printed-wiring board extenders ... (1-8), 1-2b(3)
		Pulse Generator and Sync Circuitry Printed-Wiring Board A3, ECI 61-00942-001
		part location..... (5-14)
		schematic diagram..... (5-26)
		R
		Radio Frequency Cable Assembly, CG-690D/U (1-4), 1-2a(3)(c)
		Radio Frequency Cable Assembly, CG-3489/TYA-11..... (1-4), 1-2a(3)(e)
		Radio Frequency Detector, RF-229/U (1-3), 1-2a(2)(d)
		Radio set control functional section 4-3d
		Radio Set Control Assembly, ECI 01-00507-001 test procedure 3-3d(1), *3-8
Part location illustrations	5-4a	
Control Group Test Set, ECI 01-00784-001.....	(5-11)	
Heat Sink, ECI 67-02324-001 ...	(5-5)	
Heat Sink, ECI 67-02325-001 ...	(5-8)	
Light Drivers Printed Wiring Board A2, ECI 61-00943-001..	(5-13)	
Power Supply, 18/28-Volt Printed Wiring Board A2, ECI 61-00928-001.....	(5-7)	
Pulse Generator and Sync Cir- cuitry Printed Wiring Board A3, ECI 61-00942-001	(5-14)	
Radio Set Control, C-3811/AR...	(5-9)	
Regulator +12-Volt Printed Wiring Board A1, ECI 61-00967-001.....	(5-12)	
Regulator +28-Volt Printed Wiring Board A1, ECI 61-00929-001.....	(5-4)	
Test Adapter, MX-8150/TYA-11.	(5-1)	
Test Adapter, MX-8151/TYA-11.	(5-2)	
Test Adapter, MX-8152/TYA-11.	(5-3)	
Test Adapter, MX-8158/TYA-11.	(5-10)	
Test Set Coupler, MX-8153/ TYA-11.....	(5-6)	
Transformer and Control Relay Printed Wiring Board A4, ECI 61-00944-001.....	(5-15)	
Transformers and Light Drivers Printed Wiring Board A5, ECI 61-00945-001.....	(5-16)	

INDEX (Cont)

	Paragraph (Figure) *Table		Paragraph (Figure) *Table
R (Cont)		S (Cont)	
Radio Set Control, C-3811/AR	(1-2), 1-2a(1)(e), 4-2e	Schematic diagrams (Cont)	
functional operation	3-1c(5)	Pulse Generator and Sync	
operating controls and indicators.	3-3a(3), (3-7), *3-7	Circuitry A3	(5-26)
operating instructions	3-3e(5)	Radio Set Control, C-3811/AR...	(5-22)
part location.....	(5-9)	Regulator, 12-Volt A1	(5-24)
power requirements	*2-1, 3-2	Test Adapter, MX-8152/TYA-11..	(5-20)
schematic diagram	(5-22)	Test Set Coupler, MX-8153/ TYA-11.....	(5-21)
Receiver antenna coupler		Transformer and Control	
functional section	4-2b(2)	Relay A4.....	(5-27)
Receiver-synthesizer		Transformers and Light Drivers.	(5-28)
test fixture	4-2c	Scope of technical manual.....	1-1
Reference data	1-3	Servicing block diagrams	4-5
Communications Test Kit, MK-1102/TYA-11.....	*1-2, 1-3	Servo tune signal adjustment	5-3b2
Communications Test Kit, MK-1104/TYA-11.....	*1-3, 1-3	Site selection.....	2-3
Test Set Coupler, MX-8154/ TYA-11.....	*1-4, 1-3	Special Purpose Electrical Cable	
Regulator, +12 volt	4-3a(3)	Assembly, CX-10916/TYA-11 ...	(1-4), 1-2a(3)(a)
Regulator, 12-Volt Printed Wiring Board A1, ECI61-00967-001		wire running list	*5-6
adjustment	5-3c(1)	Special Purpose Electrical Cable	
part location.....	(5-12)	Assembly, CX-10917/TYA-11 ...	(1-4), 1-2a(3)(b)
schematic diagram	(5-24)	wire running list	*5-7
Regulator, +28 volt	4-2c(1)(c)1	Special Purpose Electrical Cable	
Regulator, 28-Volt Printed Wiring Board A1, ECI61-00929-001		Assembly, CX-10918/TYA-11 ...	(1-7), 1-2b(2)(c)
adjustment	5-3b(1)	wire running list	*5-13
part location.....	(5-4)	Special Purpose Electrical Cable	
schematic diagram	5-2c(1)(c)1	Assembly, CX-10919/TYA-11 ...	(1-7), 1-2b(2)(b)
Remote audio functional section ...	4-3c	wire running list	*5-12
Remote low power indicator		Special Purpose Electrical Cable	
functional section.....	4-2d(2)	Assembly, CX-10920/TYA-11 ...	(1-7), 1-2b(2)(a)
Remote operation.....	4-2b(1)	wire running list	*5-11
Repair instructions	5-2	Special Purpose Electrical Cable	
Communications Test Kit, MK-1102/TYA-11.....	5-2a	Assembly, CX-10928/TYA-11 ...	(1-7), 1-2b(2)(d)
Communications Test Kit, MK-1104/TYA-11.....	5-2b	wire running list	*5-14
Test Set Coupler, MX-8154/ TYA-11.....	5-2c	Special Purpose Electrical Cable	
Rf power test function	4-3e(1)(c)	Assembly, CX-10929/TYA-11 ...	(1-7), 1-2b(2)(e)
		wire running list	*5-15
		Special Purpose Electrical Cable	
		Assembly W8, ECI 12-01303-001.	(1-11), 1-2c(2)(h)
		wire running list	*5-25
		Symptom recognition	4-1a
S		T	
Schematic diagrams.....	*5-3, 5-4d	Test accessories	(1-3), 1-2a(2), (1-9), 1-2b(4)
Control Group Test Set, ECI 01-00784-001.....	(5-23)		
Light Drivers A2	(5-25)		

INDEX (Cont)

	Paragraph (Figure) *Table		Paragraph (Figure) *Table
T (Cont)		T (Cont)	
Test adapters	(1-2), 1-2a(1)(a), 1-2a(1)(b), 1-2a(1)(c), (1-6), 1-2b(1), (1-8), 1-2b(3)(a), 1-2b(3)(b), 1-2b(3)(c)	Test procedures (Cont)	
Test Adapter, MX-8150/TYA-11....	(1-2), 1-2a(1)(a), 4-2a	Indicator Test Electrical	
functional operation	3-1c(1)	Assembly, ECI 01-00508-001 .	3-3d(2)
operating controls and indicators.	3-3a(2)	Radio Set Control Assembly,	
operating instructions	3-3e(1)	ECI 01-00507-001.....	3-3d(1)
part location.....	(5-1)	Test Set Coupler, MX-8153/TYA-11	
test points and connectors.....	(3-2), *3-2	ac primary power distribution..	(5-18)
wire running list.....	*5-4	adjustment	5-3b
Test Adapter, MX-8151/TYA-11....	(1-2), 1-2a(1)(b), 4-2b	functional operation	3-1c(4)
functional operation	3-1c(2)	operating controls and indicator .	3-3a(5), (3-5), *3-5
operating controls and indicator .	3-3a(3)	operating instructions	3-3e(4)
operating instructions	3-3e(2)	part location.....	(5-6)
part location.....	(5-2)	power requirements	*2-1, 2-2
test points and connectors.....	(3-3), *3-3	schematic diagram.....	(5-21)
wire running list.....	*5-5	Test Set Coupler, MX-8154/TYA-11.	(1-1), 1-2c
Test Adapter, MX-8152/TYA-11....	(1-2), 1-2a(1)(c)	adjustment	5-3c
ac primary power distribution..	(5-17)	cable assemblies.....	(1-11), 1-2c(2)
adjustment	5-3a	Control Group Test Set, ECI	
functional operation	3-1c(3)	01-00784-001.....	(1-10), 1-2c(1)
operating controls and indicators.	3-3a(4), (3-4), *3-4	description.....	1-2c
operating instructions	3-3e(3), *3-15	equipment supplied.....	*1-5, 1-4
parts location.....	(5-3)	functional operation	3-1a
power requirements	*2-1, 2-2	installation.....	(2-3), 2-4
schematic diagram.....	(5-20)	operating controls and indicators.	3-3a(1), (3-1), *3-1
Test Adapter, MX-8158/TYA-11....	(1-6), 1-2b(1)(b), 4-4	operating procedures	3-3d
part location.....	(5-10)	power requirements	*2-1, 2-2
wire running list.....	*5-10	preparation for reshipment.....	1-8
Test Adapter, MX-8158/TYA-11		Test Set Coupler, MX-8154/ TYA-11 (Cont)	
operating controls and indicators.	3-3a(6), (3-6), *3-6	reference data	*1-4, 1-3
Test fixtures	(1-2), 1-2a(1)(c), 1-2a(1)(d)	repair instructions	5-2c
Test procedures		unpacking and handling.....	2-1
Communication Central Control		Timing pulse generator.....	4-2d(3)(b)
Group, C-8019/TYA-11	3-3d(5)	Transformer and Control Relay	
DC Power Supply, ECI		Printed Wiring Board A4,	
01-00509-001.....	3-3d(3)	ECI 61-00944-001	
Five Channel Audio Amplifier-		part location.....	(5-15)
Converter, ECI 01-00730-001 .	3-3d(4)	schematic diagram.....	(5-27)
		Transformers and Light Drivers	
		Printed Wiring Board A5,	
		ECI 61-00945-001	
		adjustment	5-3b(2)
		part location.....	(5-16)
		schematic diagram.....	(5-28)
		Transmit antenna coupler func-	
		tional section	4-2b(3)
		Tuning and adjustment, operator ..	3-3c

INDEX (Cont)

	Paragraph (Figure) *Table		Paragraph (Figure) *Table
U		W (Cont)	
Unpacking and handling	2-1	Wire running lists (Cont)	
W		Cable, CX-10931/TYA-11.....	*5-17
Wide band audio function.....	4-2a(1)(a)	Cable, CX-10932/TYA-11.....	*5-8
Wire running lists	*5-2, 5-4b	Cable, CX-10933/TYA-11.....	*5-9
Cable, CX-10916/TYA-11.....	*5-6	Cable, ECI 12-01286-001	*5-18
Cable, CX-10917/TYA-11.....	*5-7	Cable, ECI 12-01288-001	*5-20
Cable, CX-10918/TYA-11.....	*5-13	Cable, ECI 12-01289-001	*5-21
Cable, CX-10919/TYA-11.....	*5-12	Cable, ECI 12-01290-001	*5-22
Cable, CX-10920/TYA-11.....	*5-11	Cable, ECI 12-01291-001	*5-23
Cable, CX-10928/TYA-11.....	*5-14	Cable, ECI 12-01292-001	*5-24
Cable, CX-10929/TYA-11.....	*5-15	Cable, ECI 12-01303-001	*5-25
Cable, CX-10930/TYA-11.....	*5-16	Test Adapter, MX-8150/TYA-11.	*5-4
		Test Adapter, MX-8151/TYA-11.	*5-5
		Test Adapter, MX-8158/TYA-11.	*5-10

